ORDER NO. AVS87072040S8

Service Manual

Colour CCTV Cameras
WV-CD130/WV-CD132/WV-CD134
White Balance Controller
WV-RC130

CONTENTS

LIST OF MODIFICATION 1

CAMERA ADJUSTMENT 2

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS 14

POWER BOARD 16

HEAD BOARD 17

GEN-LOCK/SYNC BOARD 19

PROCESS BOARD 21

MICROPROCESSOR BOARD 23

MOTHER BOARD 25

REPLACEMENT PARTS LIST 27

National/Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

LIST OF MODIFICATION

◆Power Board (on page 16)

- Power board has been corrected as shown on page 16.

◆Head Board (on page 17,18)

- Printing of Head board has been changed since April products,1987.
- VR1,VR2,VR3,VR4,VR5 have been changed to prevent making a short circuit by contacting these VR each other since June products,1987.
- The rest of part numbers have been changed as shown in the parts list.

◆CCD Board (on page 17,18)

- Printing of CCD board has been changed since April products,1987.
- R13 has been changed to prevent horizontal line noise.
- The rest of part numbers have been changed as shown in the parts list.

◆Gen-lock/Sync Board (on page 19,20)

- Printing of Gen-Lock/Sync board has been changed since April products,1987.
- C27 has been changed to prevent interference on the monitor when power is turned on since April products,1987.
- The rest of part numbers have been changed as shown in the parts list.

◆Process Board (on page 21,22)

- Printing of Process board has been changed since April products,1987.
- R53 has been changed to change aperture gain since April products,1987.
- R27 has been changed to change chroma clip level.
- The rest of part numbers have been changed as shown in the parts list.

◆Process VIC-1 Board (on page 21,22)

- Printing of Process VIC-1 board has been changed since April products,1987
- The part numbers have been changed as shown in the parts list.

◆Process VIC-2 Board (on page 21,22)

- Printing of Process VIC-2 board has been changed since April products,1987.
- R3 has been changed to change vertical aperture gain.
- The rest of part numbers have been changed as shown in the parts list.

◆Process VIC-3 Board (on page 21,22)

- Printing of Process VIC-3 board has been changed since April products,1987.
- CT1 has been changed to adjust chroma phase more easily since April products,1987.
- The rest of part numbers have been changed as shown in the parts list.

◆Microprocessor Board (on page 23,24)

- Printing of Microprocessor board has been changed since April products,1987.
- R200 has been changed to chip type resistor ,which will be applied August products,1987.
- The rest of part numbers have been changed as shown in the parts list.

◆Mother Board (on page 25,26)

- Printing of Mother board has been changed since April products,1987.
- The part numbers have been changed as shown in the parts list.

◆Control Board (on page 25,26)

- R1,R2 have been changed to change adjustment range of manual white balance.
- R3 has been changed to prevent that SES mode control does not work, which has been applied since March products,1987.
- The rest of part numbers have been changed as shown in the parts list.

4-2 Camera Adjustment

■ This camera adjustment has been revised.

Note : Before adjusting the camera unit , adjust the camera flangeback briefly while referring to (28) Frangeback adjustment on page 48.

(1) +12V adjustment
(Power board for WV-CD130/WV-CD134)

Test point :	Pin 2 of CN401	Power board
Adjust :	R408 (+12V ADJ)	Power board

- o Connect the digital voltmeter (DVM) probe between pin 2 of CN401 on the Power board and chassis.
- o Adjust R408 (+12V ADJ) on the Power board for +12V.

(2) +4.9V Adjustment

Test point:	TP4 (+4.9V)	Mother board
Adjust:	VR1 (+4.9V ADJ)	Mother board

- o Connect the digital voltmeter (DVM) to TP4 (+4.9V).
- o Adjust VR1 (+4.9V ADJ) for 4.9V ±0.05V.

(3) White balance control adjustment

Test points :	TP2 (+1.8V)	Mother board
	TP9 (R/B)	Mother board
Adjust :	VR1 (White balance control)	Control board

- o Connect the digital voltmeter to TP2 (+1.8V) and note the voltage of TP2.
- o Connect the digital voltmeter to TP9 (R/B).
- o Adjust VR1 (white balance control) on the control board so that the voltage of TP9 becomes same voltage as TP2.

(4) SW OSC adjustment

Test point :	Cathode of D1 (68KHz)	Mother board
Adjust :	VR2 (SW OSC ADJ)	Mother board

- o Connect the frequency counter to cathode of D1 (68KHz).
- o Adjust VR2 (SW OSC ADJ) for 68KHz ± 0.5KHz.

(5) Subcarrier adjustment

Test point:	Pin 8 of CN5	Mother board
Adjust:	VR2 (SC ADJ)	Gen-lock/sync board

- o Connect the frequency counter to Pin 8 of CN5 on the Mother board.
- o Adjust VR2 (SC ADJ) for 4.433618 ± 10 Hz.

(6) EXT SC VCO bias adjustment

Test point :	Pin 8 of CN5	Mother board
Adjust :	VR1 (EXT SC VCO BIAS)	Gen-lock/sync board

- o Supply the black and white signal from the signal generator to the Gen-lock input connector on the rear of camera.
- o Connect the frequency counter to Pin 8 of CN5 on the Mother board.
- o Adjust VR1 (EXT SC VCO BIAS) on the Gen-lock/sync board for 4.433618 ± 10Hz.

(7) Gen-lock VCO adjustment

Test point:	TP1 (EXT SC VCO)	Gen-lock/sync board
Adjust:	L6 (GEN-LOCK VCO)	Gen-lock/sync board

- o Keep the color bar or black burst signal from the special effects generator (SEG) or the signal generator to the Gen-lock input connector on the rear of the camera.
- o Connect the digital voltmeter (DVM) to TP1.
- o Adjust L6 (GEN-LOCK VCO) for 4V ± 0.1V.
- o Disconnect the color bar or black burst signal from Gen-lock input connector on the rear of the camera.

(8) INT SYNC VCO adjustment

Test point :	TP2 (INT SYNC VCO)	Gen-lock/sync board
Adjust :	L7 (INT SYNC VCO)	Gen-lock/sync board

- o Connect the digital voltmeter to TP2 (INT SYNC VCO).
- o Adjust L7 (INT SYNC VCO) for 4.0 ± 0.1V.

(9) V. transfer pulse adjustment

Test points:	TP3 (øVM2)	Head board
	TP4 (øVM1)	Head board
	VR1 (øVM1 ADJ)	Head board
Adjusts:	VR4 (øVH ADJ)	Head board
	VR5 (øVM2 ADJ)	Head board

- Cap on the lens.
- Connect the oscilloscope to TP3 (øVM2) and set the oscilloscope to V. rate.
- Set the input of the oscilloscope to the DC-coupled.
- Adjust VR4 (øV_H ADJ) so that the high level of the V. transfer pulse is 13V. (Fig. 4-2-1)

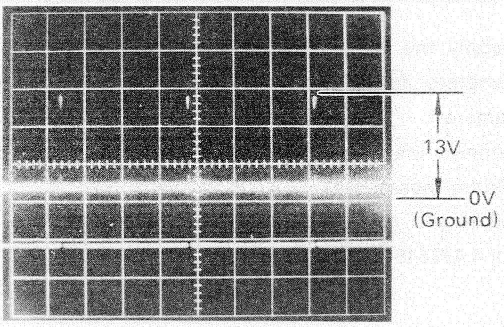


Fig. 4-2-1

- Confirm that the black horizontal lines are not observed in the Zone I on the color video monitor. (Fig. 4-2-2 and Fig. 4-2-3)

  Note : Adjust the contrast brightness of the color video monitor for better viewing.

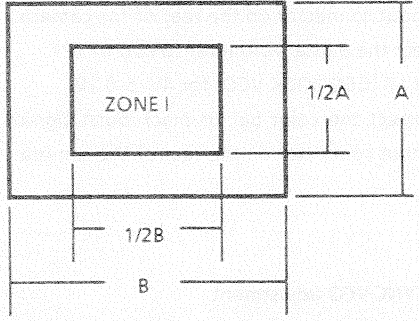
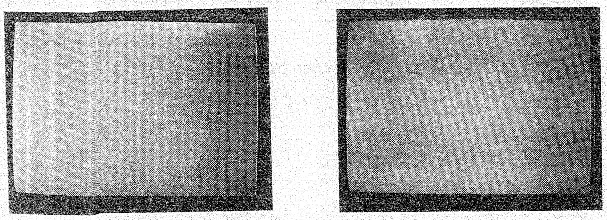


Fig. 4-2-2



NO GOOD GOOD

Fig. 4-2-3

- If the black horizontal lines are observed in the Zone I, readjust VR4 (øV_H ADJ) so that the black horizontal lines disappear from the Zone I. After adjustment, confirm that the high level of the V. transfer pulse is 13V ± 0.3V. (Fig. 4-2-4)

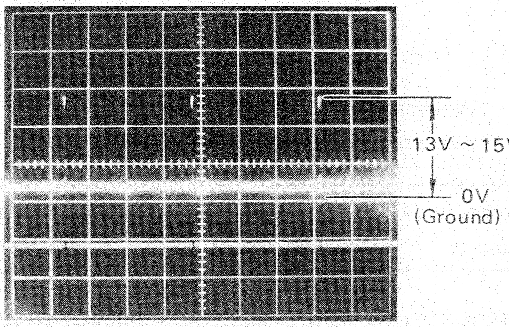


Fig. 4-2-4

- Set the oscilloscope to H. rate.
- Adjust VR5 (øVM2 ADJ) so that the middle level of the V. transfer pulse at TP3 (øVM2) is 3V ± 0.1V. (Fig. 4-2-5)

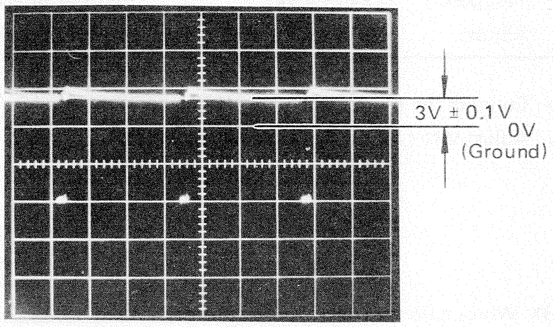


Fig. 4-2-5

- Set the oscilloscope to H.rate.
- Connect the oscilloscope to TP4 (øVM1).
- Adjust VR1 (øVM1 ADJ) so that the middle level of the V.transfer pulse at TP4 (øVM1) is 3V ± 0.1V. (Fig. 4-2-6)

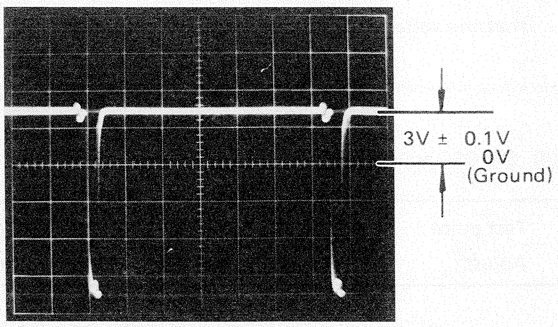


Fig. 4-2-6

(10) f_H PLL adjustment

Test point:	TP1 (f_H VCO)	Head board
Adjust:	L3 (f_H VCO)	Head board

- o The extension board YFVKZD130E2A is required for this adjustment.
- o Disconnect the CN2 on the Head board.
- o Connect the digital voltmeter (DVM) to TP1 (f_H VCO).
- o Adjust L3 (fH VCO) for 3 ± 0.1V.
- o Connect the CN2 on the Head board.

(11) CCD bias coarse adjustment

Adjust:	VR2 (CCD BIAS)	Head board
Observe:	Color video monitor	

- o Turn SW1 (POWER SWITCH) to OFF position.
- o Disconnect the automatic iris control (AIC) connector from the camera.
- o Change AIC lens to manual iris lens (f1.4 16mm C-mount).
- o Turn SW1 (POWER SWITCH) to ON position.
- o Aim the camera at a 40-watt lamp placed in front of the dark background. (Fig. 4-2-7)

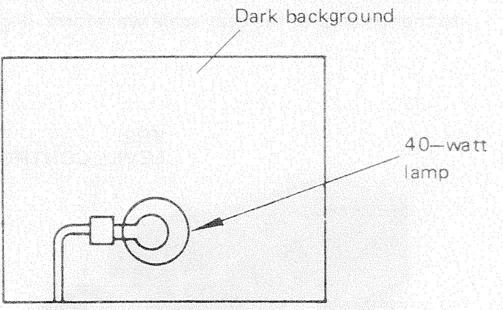
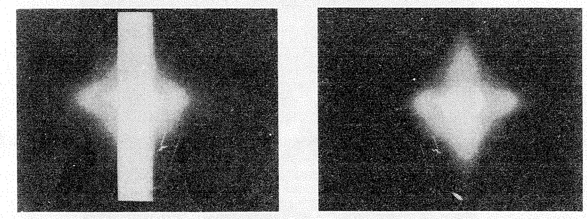


Fig. 4-2-7

- o Set the lens iris to OPEN position (f1.4).
- o While observing the picture on the color video monitor, turn VR2 (CCD BIAS) clockwise or counterclockwise and stop it at a point where the blooming and the noise are minimized. (Fig. 4-2-8)



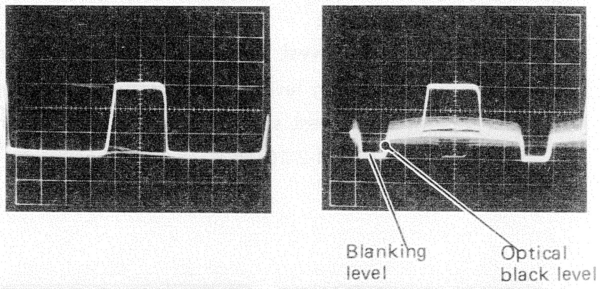
NO GOOD GOOD

Fig. 4-2-8

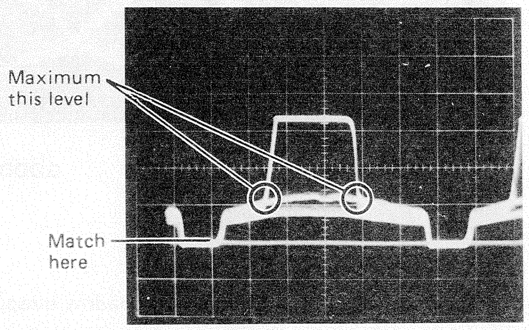
(12) Output gate adjustment

Test point:	TP8 (TRACKING)	Head board
Adjust:	VR3 (OUTPUT GATE)	Head board
Observe :	Color video monitor	

- o Keep the lens iris to OPEN position.
- o Aim the camera at the white set chart so that the chart fully occupies the color video monitor.
- o Connect the oscilloscope to TP8 (TRACKING) and set the oscilloscope to H rate.
- o Adjust VR3 (OUTPUT GATE) so that the black level following to the white level at TP8 is maximum and the difference between the blanking level and the optical black level is minimum. (Fig. 4-2-9)



NO GOOD NO GOOD



GOOD

Fig. 4-2-9

- o Turn SW1 (POWER SWITCH) to OFF position.
- o Change the manual iris lens to AIC lens.
- o Connect the automatic iris control (AIC) connector to the camera.
- o Turn SW1 (POWER SWITCH) to ON position.
- o Cap on the lens and the SES/Normal Selection Switch SW2 on the Control board to the right (SES) position.
- o Confirm that there is no white-shadow at the higher portion of picture. If it is observed, carefully readjust VR3 (OUTPUT GATE) so that the shadow just disappears from the screen. (Fig. 4-2-10-1)

Note : Adjust the contrast and brightness of the color video monitor for better viewing.

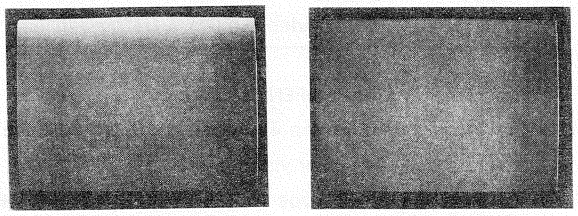
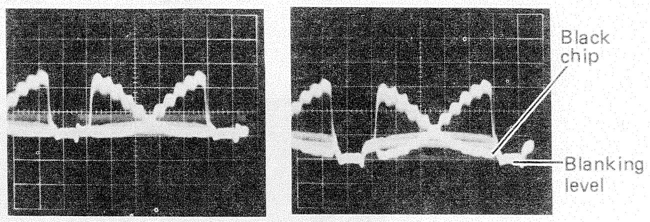

NO GOOD GOOD

Fig. 4-2-10-1

- o Remove the lens cap.
- o Aim the camera at the gray scale chart.
- o Connect the oscilloscope to TP8 (TRACKING) and set the oscilloscope to H rate.
- o Confirm that the lowest step (black chip) of gray scale is higher than blanking level of waveform. If not, readjust VR3 so that the lowest step of gray scale is higher than blanking level. (Fig. 4-2-10-2)



NO GOOD GOOD

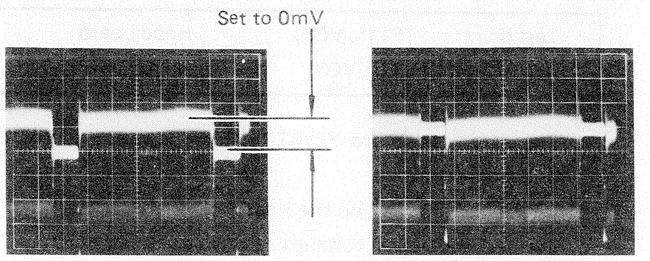
Fig. 4-2-10-2

- o Repeat above steps until the white shadow disappears and the lowest step of gray scale is higher than blanking level.
- o Set the SES/Normal Selection switch SW2 on the control board to left (NOR) position.

(13) Y Pedestal adjustment

Test point:	TP9 (Y_H)	Head board
Adjust:	VR7 (Y.PED)	Head board

- o Cap on the lens.
- o Connect the oscilloscope to TP9 (Y_H).
- o Set the oscilloscope to H. rate.
- o Adjust VR7 (Y.PED) so that the pedestal level at TP9 (Y_H) becomes 0mV ± 5mV. (Fig. 4-2-11)
- o Remove the lens cap.



NO GOOD GOOD

Fig. 4-2-11

(14) Lens iris adjustment

Test point:	TP8 (TRACKING)	Head board
Adjust:	VR2 (LEVEL CONTROL)	Lens board

- o Aim the camera at the logarithmic gray scale chart so that the chart fully occupies the raster of the color video monitor.
- o Connect the oscilloscope to TP8 (TRACKING).
- o Set the oscilloscope to H. rate.
- o Adjust VR2 (LEVEL CONTROL) on the lens (Fig. 4-2-12) so that the waveform is 0.5V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-13)

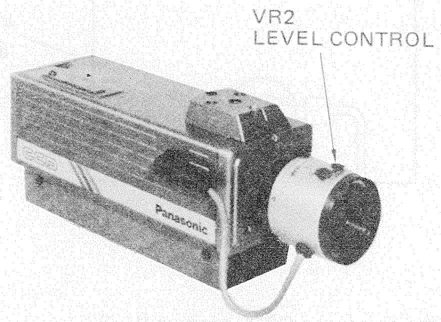


Fig. 4-2-12

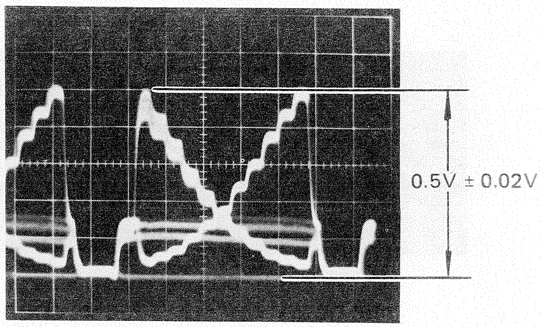


Fig. 4-2-13

(15) AGC adjustment

Test point:	TP9 (Y_H)	Head board
Adjusts:	VR8 (AGC GAIN)	Head board
	VR9 (MANUAL GAIN)	Head board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP9 (Y_H).
- Set the oscilloscope to H. rate.
- Set the AGC ON/OFF Switch SW4 on the Control board to the right (ON) position.
- Adjust VR8 (AGC GAIN) on the Head board for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-14)

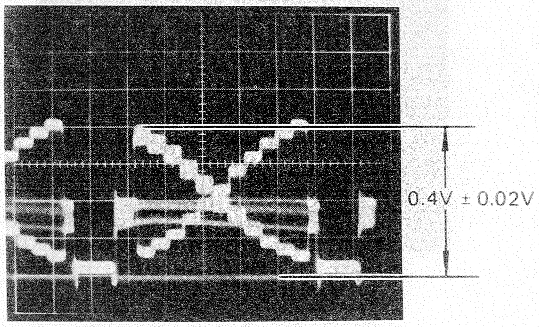


Fig. 4-2-14

- Set the AGC ON/OFF Switch SW2 to the left (OFF) position.
- Adjust VR9 (MANUAL GAIN) on the Head board for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-14)
- Reset the AGC ON/OFF switch SW4 to the right (ON) position.

(16) Y_H 1H Bias adjustment

Test points:	TP1 (Y_H (1H) BIAS)	VIC1/Process board
	Pin 9 of E1	VIC1/Process board
Adjusts:	VR1 (Y_H (1H) BIAS)	VIC1/Process board
	VR2 (Y_H (1H) GAIN)	VIC1/Process board

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP1 (Y_H (1H) BIAS) on the VIC1 of the Process board.
- Set the oscilloscope to H. rate.
- Set the input of the oscilloscope to the DC- coupled.
- Turn VR1 (Y_H (1H) BIAS) on the VIC1/Process board fully counterclockwise to minimize the DC level.
- Adjust the vertical position control of the oscilloscope so that the DC waveform coincides with the voltage scale of the oscilloscope. (Fig. 4-2-15)

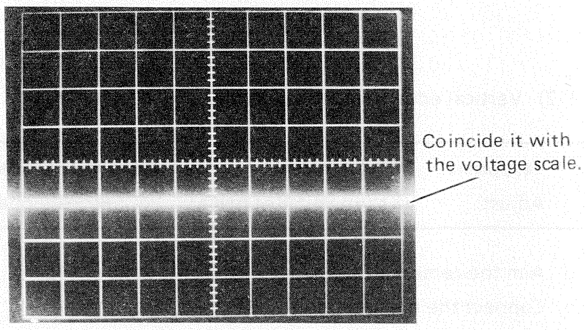


Fig. 4-2-15

- Adjust VR1 (Y_H (1H) BIAS) so that the blanking level increases 700mV ± 20mV. (Fig. 4-2-16)

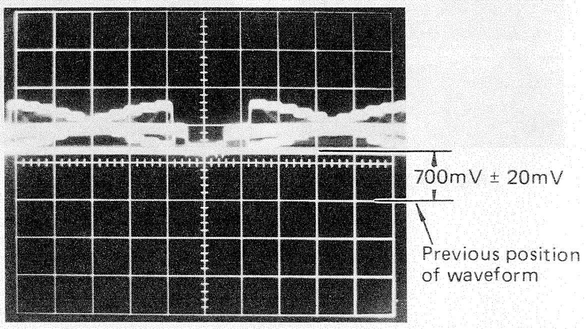


Fig. 4-2-16

- o Change the probe of the oscilloscope from TP1 (Y_H (1H) BIAS) to pin 9 of E1 on the VIC1/Process board.
- o Set the input of the oscilloscope to the AC- coupled.
- o Adjust VR2 (YH (1H) GAIN) for 0.4V ± 0.02V from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-17)

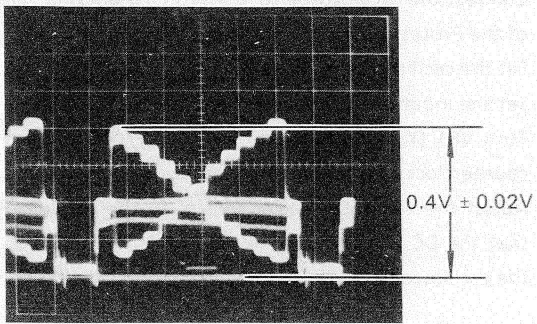
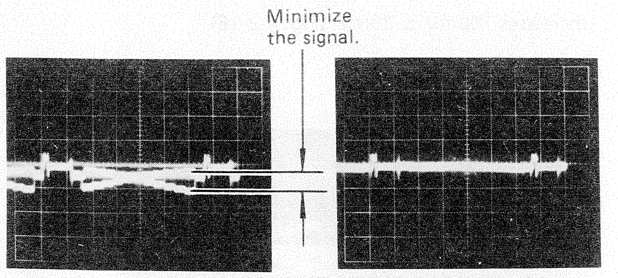


Fig. 4-2-17

(17) Vertical edge balance adjustment

Test point:	TP1 (V.EDGE)	VIC2/Process board
Adjust:	VR1 (V.EDGE BALANCE)	VIC2/Process board

- o Aim the camera at the logarithmic gray scale chart.
- o Connect the oscilloscope to TP1 (V.EDGE).
- o Set the oscilloscope to H. rate.
- o Adjust VR1 (V.EDGE BALANCE) so that the gray scale waveform becomes minimum. (Fig. 4-2-18)



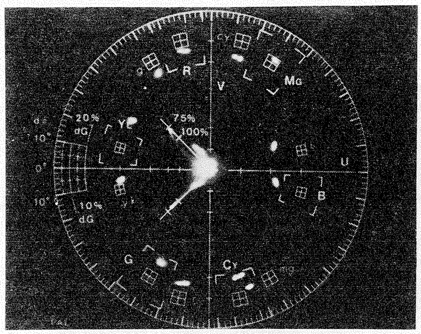
NO GOOD GOOD

Fig. 4-2-18

(18) Chroma phase detection and gain adjustment

Test point:	Video output connector	
	Plus pole of C25	Process board
Adjust:	VR1 (R/B GAIN)	Process board
	VR2 (CHROMA PHASE DETECT)	Processboard

- o Connect the Video Output Connector to the vectorscope.
- o Aim the camera at the color chart so that the chart fully occupies the raster of the color video monitor.
- o Adjust VR2 (CHROMA PHASE DETECT) so that the color vector is maximum on the vectorscope. (Fig. 4-2-19)



Maximize the vectors.

Fig. 4-2-19

- o Connect the oscilloscope to plus pole of C25 and set the oscilloscope to H. rate.
- o Adjust VR1 (R/B GAIN) so that the signal level at plus pole of C25 is 0.6 ± 0.01V. (Fig. 4-2-20)

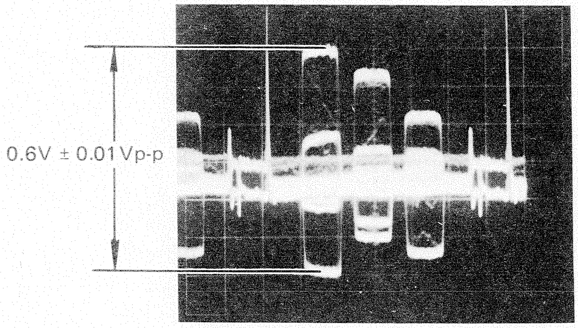
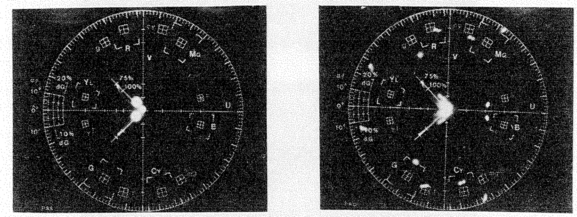


Fig. 4-2-20

(19) Spot correction offset adjustment

Test point:	Video output connector	
Adjust:	VR6 (CORRECTION OFFSET)	Head board

- o This adjustment is only for the cameras which has the IC5 on the Head board.
- o Connect the Video Output Connector to the vectorscope.
- o Cap on the lens.
- o While observing the vectorscope, adjust VR6 (CORRECTION OFFSET) so that the vector positions at the center of the vectorscope. (Fig. 4-2-21)



NO GOOD GOOD

Fig. 4-2-21

(20) CCD bias fine adjustment

Test point:	TP3 (VIDEO)	Process board
Adjust:	VR2 (CCD BIAS)	Head board
Observe:	Color video monitor	

- o Turn SW1 (POWER SWITCH) to OFF position.
- o Disconnect the automatic iris control (AIC) connector from camera.
- o Change AIC lens to manual iris lens.
- o Set SW1 (POWER SWITCH) to ON position.
- o Aim the camera at a 40-watt lamp placed in front of dark background. (Fig. 4-2-22)

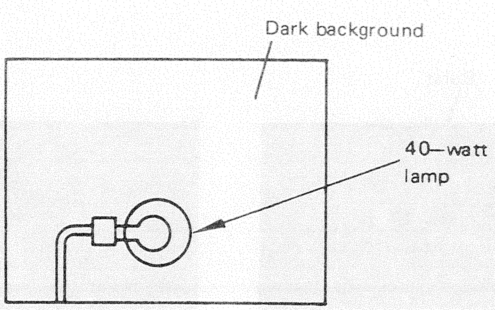
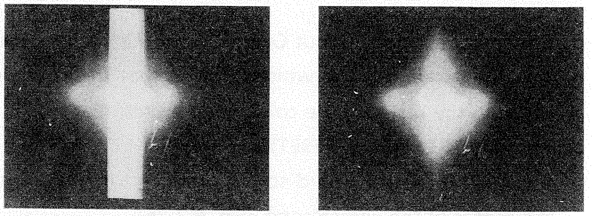


Fig. 4-2-22

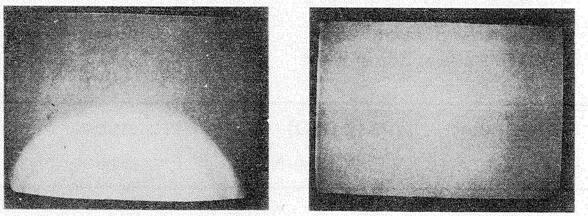
- o Set the lens iris to the OPEN position.
- o Adjust VR2 (CCD BIAS) so that the blooming and the noise are minimized. (Fig. 4-2-23)



NO GOOD GOOD

Fig. 4-2-23

- o Set the SES/Normal Selection Switch SW2 on the Control board to the right (SES) position.
- o Aim the camera at the white chart/paper.
- o Confirm that there is no shadow (caused by the insufficient transfer of charge) at the lower portion of picture. If it is observed, carefully adjust VR2 (CCD BIAS) so that the shadow just disappears from the screen. (Fig. 4-2-24)



NO GOOD GOOD

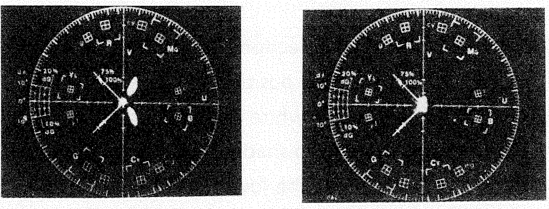
Fig. 4-2-24

- o Set the SES/Normal Selection Switch SW2 to the left (NOR) position.
- o Aim the camera at the gray scale chart.
- o Place the 1/8 ND filter in front of lens and confirm that the gray scale waveform at TP3 (VIDEO) on the Process board is not suppressed.
- o Turn SW1 (POWER SWITCH) to OFF position.
- o Change the manual iris lens to AIC lens.
- o Connect the automatic iris control (AIC) connector to the camera.
- o Turn SW1 (POWER SWITCH) to ON position.

(21) White balance preset course adjustment

Test point:	Video output connector	
Adjusts:	VR4 (R ATW PRESET)	Microprocessor board
	VR5 (B ATW PRESET)	Microprocessor board

- o Connect the Video Output Connector to the vectorscope.
- o Aim the camera at the white chart so that the chart fully occupies the raster of the color video monitor.
- o Adjust VR4 (R ATW PRESET) and VR5 (B ATW PRESET) on the Microprocessor board so that the vector positions at the center of the vectorscope. (Fig. 4-2-25)



NO GOOD GOOD

Fig. 4-2-25

(22) Video level adjustment

Test point:	TP3 (VIDEO)	Process board
Adjust:	VR5 (YH GAIN)	Process board

- o Aim the camera at the gray scale chart.
- o Connect the oscilloscope to TP3 (VIDEO).
- o Set the oscilloscope to H. rate.
- o Adjust VR5 (YH GAIN) for 0.7 ± 0.05V (100IRE ± 7IRE) from the blanking level to the top step of the gray scale waveform. (Fig. 4-2-26)

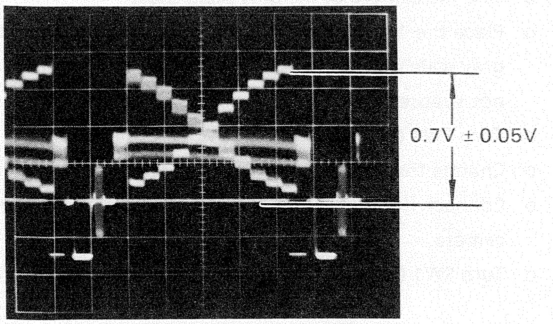


Fig. 4-2-26

(23) Y pedestal adjustment

Test point :	TP9 (Y_H)	Head board
Adjust :	VR7 (Y.PED)	Head board

- o Cap on the lens.
- o Connect the oscilloscope to TP9 (Y_H).
- o Make sure that pedestal level at TP9 (Y_H) is 0 ± 5mV.
- o If not, readjust VR7 (Y.PED) so that the pedestal level at TP9 (Y_H) becomes 0 ± 5mV. (Fig. 4-2-27)

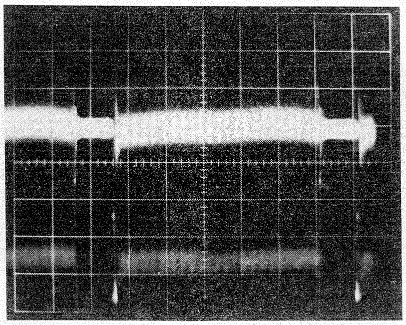


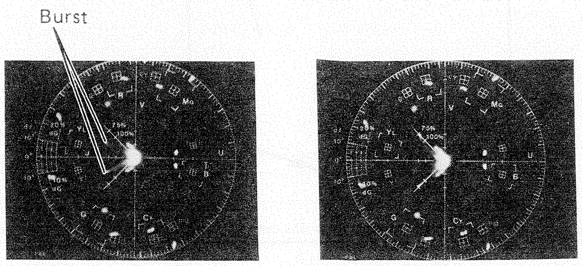
Fig. 4-2-27

- o Remove the lens cap.

(24) Burst phase adjustment

Test point:	Video output connector	
Adjust:	VR2 (BURST PHASE)	VIC3/Process board

- o Connect the Video Output connector to the vectorscope.
- o Aim the camera at the logarithmic gray scale chart.
- o Adjust VR2 (BURST PHASE) so that the burst vectors position (90° ± 2°) on the burst axis of the vectorscope. (Fig. 4-2-28)



NO GOOD GOOD

Fig. 4-2-28

(25) Chroma gain, B-Y_L gain, chroma phase, R matrix, chroma clip and burst gain adjustment

Test point:	Video output connector	
Adjusts:	VR4 (CHROMA GAIN)	VIC3/Process board
	VR3 (BURST GAIN)	VIC3/Process board
	CT1 (CHROMA PHASE)	VIC3/Process board
	VR3 (B-Y_L GAIN)	Process board
	VR1 (R MATRIX)	VIC3/Process board
	VR4 (CHROMA CLIP)	Process board

- Connect the Video Output Connector to the vectorscope.
- Aim the camera at the color chart so that the chart fully occupies the raster of the color video monitor.
- Adjust the Phase Control of the vectorscope so that the burst vector positions on the burst axis on the vectorscope.
- Adjust VR3 (BURST GAIN) on the VIC3/Process board so that the burst level is 75% on the vectorscope. (Fig. 4-2-29)

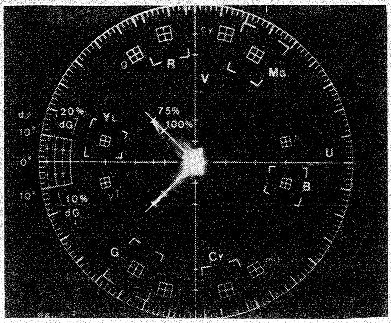

cy
R
Mg
V
YL
75%
100%
20%
dG
10%
U
B
G
Cy
mg
PAL

Fig. 4-2-29

- Adjust VR4 (CHROMA GAIN) on the VIC3/Process board so that the red vector is 180% ± 25% as compares to the burst vector on the vectorscope. (Fig. 4-2-30)

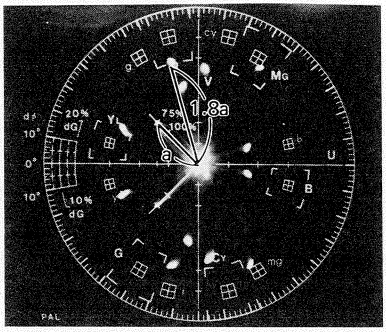

cy
Mg
V
1.8a
a
75%
100%
20%
dG
10%
U
B
G
Cy
mg
PAL

Fig. 4-2-30

- Adjust VR3 (B-Y_L GAIN) so that the yellow vector is 135% ± 25% as compares to the burst vector. (Fig. 4-2-31)

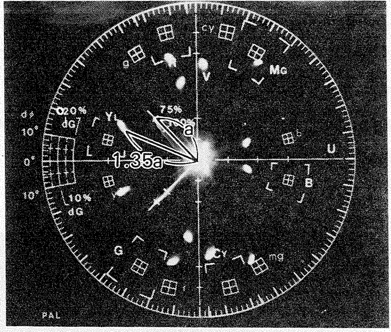

cy
Mg
V
a
75%
1.35a
20%
dG
10%
U
B
G
Cy
mg
PAL

Fig. 4-2-31

- Set the vectorscope to the NTSC mode and adjust the Phase Control of vectorscope so that burst vectors coincide each other.
- Adjust CT1 (CHROMA PHASE) on the VIC3/process board so that the red vectors for odd and even field coincide each other.
- Adjust VR1 (R MATRIX) on the VIC3/process board so that the phase of red vector is 102° ± 7°. (Fig. 4-2-32)

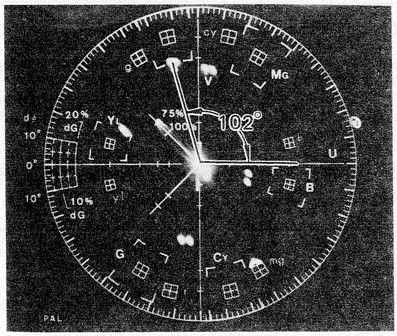

cy
Mg
V
102°
75%
100%
20%
dG
10%
U
B
G
Cy
mg
PAL

Fig. 4-2-32

- Repeat adjusting VR3 (B-YL GAIN), VR4 (CHROMA GAIN) and VR1 (R MATRIX) so that the yellow vector and red vector are 135% ± 25% and 180% ± 25% respectively as compare to burst vector and the phase of red vector is 102° ± 7°. (Fig. 4-2-33)

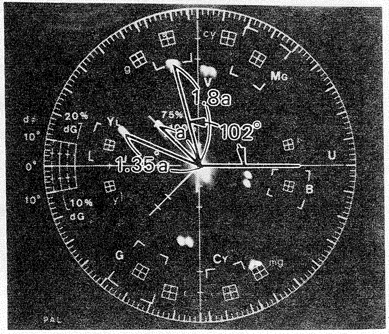

cy
Mg
V
1.8a
a
102°
75%
1.35a
20%
dG
10%
U
B
G
Cy
mg
PAL

Fig. 4-2-33

- Set the vector scope to the PAL mode.
- Turn VR1 (WHITE BALANCE CONTROL) on the rear panel fully clockwise to maximum the red gain.
- Adjust VR4 (CHROMA CLIP) on the process board so that the red vector is clipped at 233 ± 5% as compare to the burst vector. (Fig. 4-2-34)
- After adjusting VR4, readjust VR1 while referring to (2) White Balance Control adjustment on page.

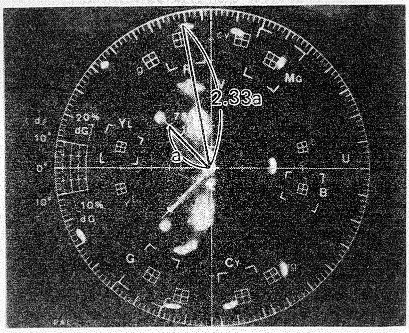


Fig. 4-2-34

(26) White balance preset fine-adjustment

Test point:	Video output connector	
Adjusts:	VR4 (R ATW PRESET)	Microprocessor board
	VR5 (B ATW PRESET)	Microprocessor board

- Connect the Video Output Connector to the vectorscope.
- Set the White Balance Selection Switch to the MANU position and turn SW1 (POWER SWITCH) to OFF position once to reset the white balance.
- Aim the camera at the white chart so that the chart fully occupies the raster of the color video monitor.
- Confirm that the vector positions at the center of the vectorscope. If not, adjust VR4 (R ATW PRESET) and VR5 (B ATW PRESET) on the Microprocessor board so that the vector positions at the center of the vectorscope. (Fig. 4-2-35)

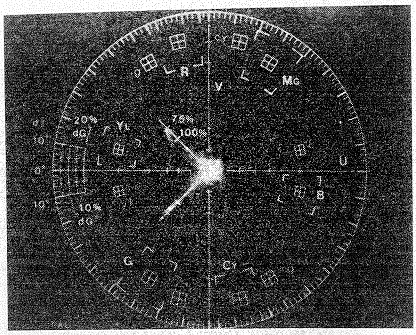


Fig. 4-2-35

(27) ATW gain adjustment

Test point :	Video output connector	
Adjusts :	VR2 (R ATW GAIN)	Microprocessor board
	VR3 (B ATW GAIN)	Microprocessor board

- Set the White Balance Selection switch to ATW position.
- Aim the camera at the white chart so that the carefully occupies the raster of the color video monitor.
- Set the color temperature conversion filter which converts 3200°K to 5200°K in front of the lens.

  Note : If there is no color temperature conversion filter, the ATW gain can roughly be adjusted by using the outdoor light.
- Adjust VR2 (R ATW GAIN) and VR3 (B ATW GAIN) so that the vector positions at center of vectorscope. (Fig. 4-2-36)

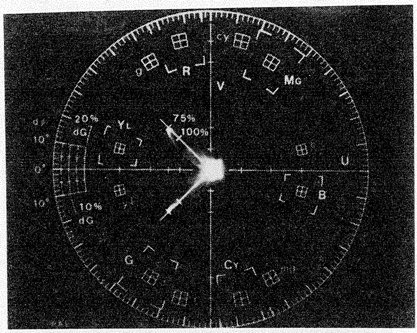


Fig. 4-2-36

- Remove the color temperature conversion filter from the lens.
- Confirm that the vector on the vectorscope positions at the center. If not, repeat adjustment of (26) and (27).

(28) Flangeback adjustment

Adjust:	Flangeback adjusting ring
Observe:	Color video monitor

- o Aim the camera at an object which is illuminated approx. 10 footcandles (100 lux) and further than 10 meters.
- o Set the lens focus ring to ∞ position.
- o Loosen the two hex screws on the flange adjusting ring by using supplied hex-wrench. (Fig. 4-2-37)
- o Turn the flange adjusting ring by using supplied hex-wrench to the best focus position.
- o Tighten the two hex screws on the flange adjusting ring by using supplied hex-wrench.

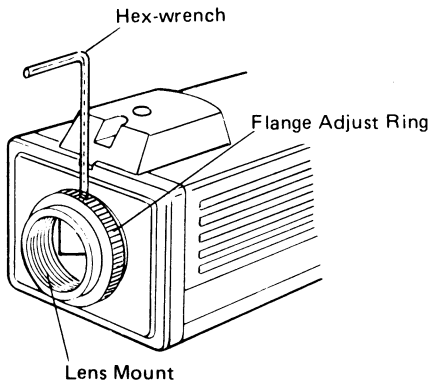


Fig. 4-2-37

(29) Character size adjustment

Test point :	Video output connector	
Adjust :	VR1 (CHARACTER SIZE)	Microprocessor board

- o Cap on the lens.
- o Set SW4 (CAMERA NUMBER ON/OFF SWITCH) on the Microprocessor board to ON position and SW1, 2, 3 (CAMERA NUMBER SETTING SWITCH) on Microprocessor board to O position.
- o Connect the oscilloscope to Video Output connector and trigger the oscilloscope at H.rate.
- o Expand the horizontal period on the oscilloscope.
- o Adjust VR1 (CHARACTER SIZE) on the Microprocessor board so that the blanking lags by 8 µsec ± 0.5 µsec the character signal. (Fig. 4-2-38)

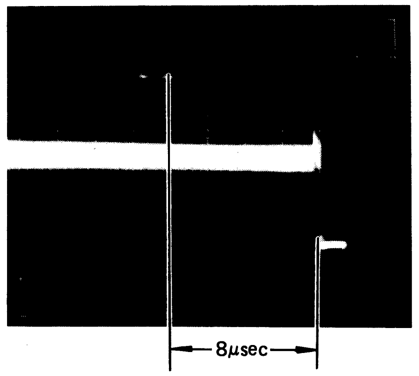


Fig. 4-2-38

(30) Horizontal phase adjustment

Test points :	TP3 (VIDEO)	Process board
	TP3 (GEN-LOCK)	Gen-lock/sync board
Adjust :	VR4 (H.PHASE)	Gen-lock/sync board

- o Supply the black burst signal from the special effect generator (SEG) or signal generator to the GEN-LOCK INPUT connector on the rear of the camera.
- o Connect the oscilloscope to TP3 (VIDEO) on the process board and TP3 (GEN-LOCK) on the Gen-lock/sync board and trigger the oscilloscope at H.rate.
- o Expand the H sync period on the oscilloscope.
- o Confirm that the sync of gen-lock signal at TP3 (GEN-LOCK) leads by more than 0.5 µsec and lags more than 0.5 µsec sync signal at TP3 (VIDEO) as VR4 (H.PHASE) on the Gen-lock/sync board is turned through its range.
- o After confirmed the above step, adjust VR4 so that the leading edge of both signal are coincident.

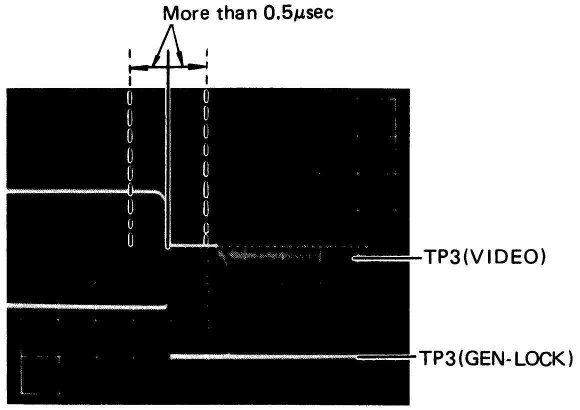


Fig. 4-2-39

(31) Confirmation of subcarrier phase

Test point:	Video output connector	
Adjusts:	SW1 (SC PHASE COARSE SW1)	Gen-lock/sync board
	SW2 (SC PHASE COARSE SW2)	Gen-lock/sync board
	VR3 (SC PHASE FINE)	Gen-lock/sync board
Observe:	Vectorscope	

- o Keep the black burst signal from the special effect generator (SEG) or signal generator to the GEN-LOCK connector on the rear of the camera.
- o Aim the camera at the color chart.
- o Keep the subcarrier (SC) signal from the special effect generator (SEG) or signal generator to the external subcarrier reference (EXT CW ø REF) connector on the rear of the vectorscope and set the burst mode (ø REF) of vectorscope to EXT position.
- o Set SW1 (SC PHASE COARSE SW1) and SW2 (SC PHASE COARSE SW2) 0° position and turn VR3 (SC PHASE FINE) fully counterclockwise.
- o Confirm that the burst phase changes more than 90°, 180° and 270° position. (Fig. 4-2-40)

- o Confirm that the burst phase changes more than 90°, when VR3 is turned back. (The burst phase changes more than 360° by setting SW1, SW2 and VR3.)
- o Reset SW1 and SW2 to the 0° position and return VR3 fully counterclockwise.
- o Disconnect the black burst signal from the GEN-LOCK connector, and the external subcarrier signal from the vectorscope.

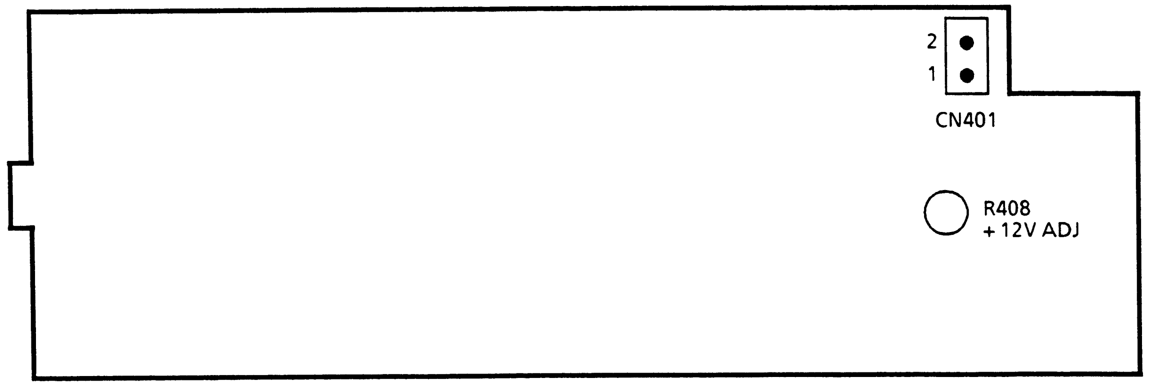
SC Phase Coarse Switch Selection

SC Phase	0°	90°	180°	270°
SW1 Position of Switch	■□ 1 2	■□ 1 2	□■ 1 2	□■ 1 2
SW2	■□ 3 4	□■ 3 4	■□ 3 4	□■ 3 4

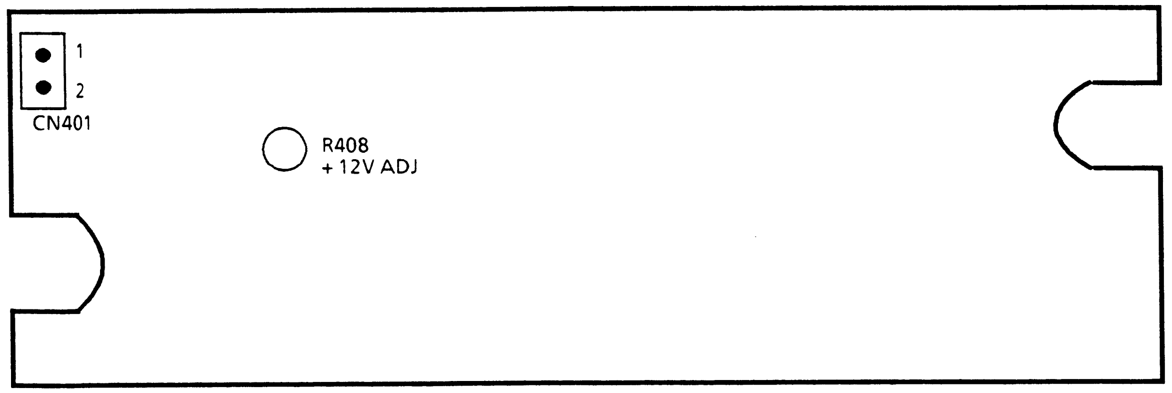
Fig. 4-2-40

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

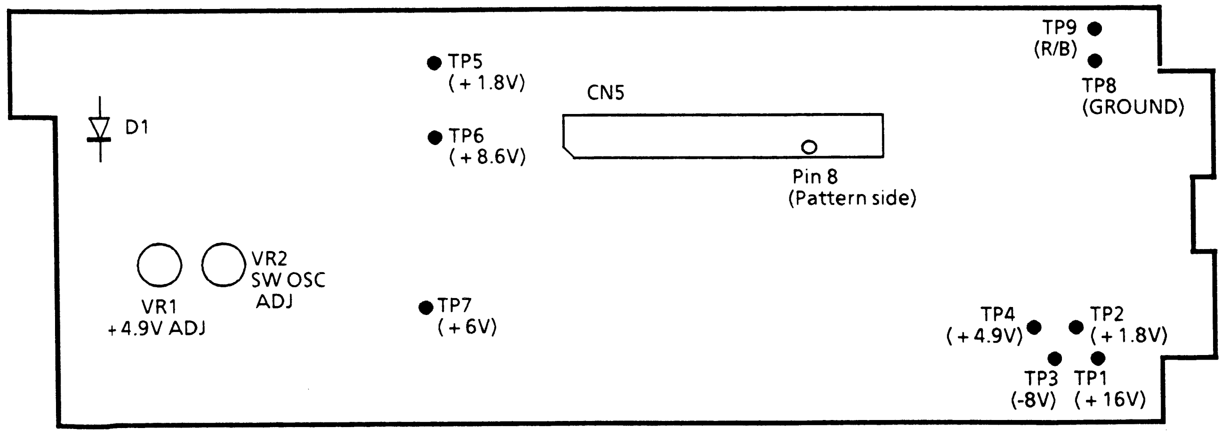
POWER BOARD (WV-CD130)


2
1
CN401
R408
+ 12V ADJ

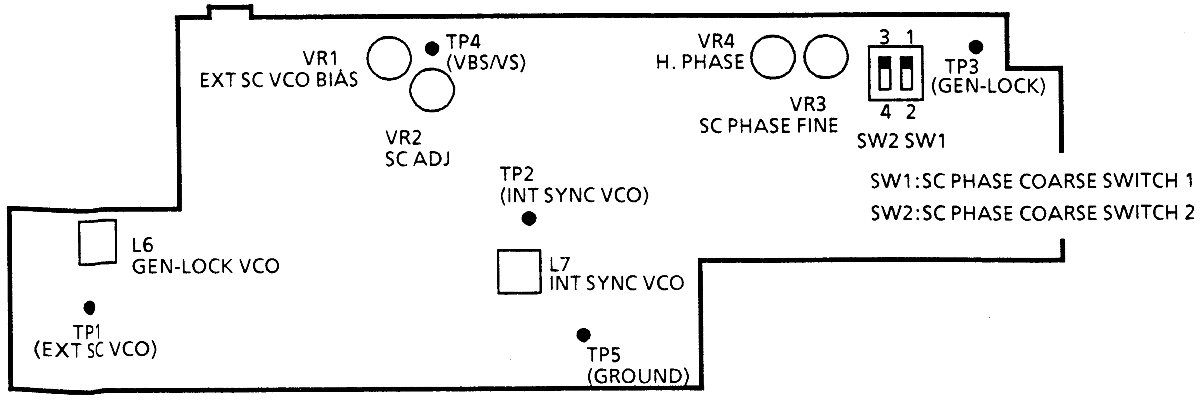
POWER BOARD (WV-CD134)


1
2
CN401
R408
+ 12V ADJ

MOTHER BOARD

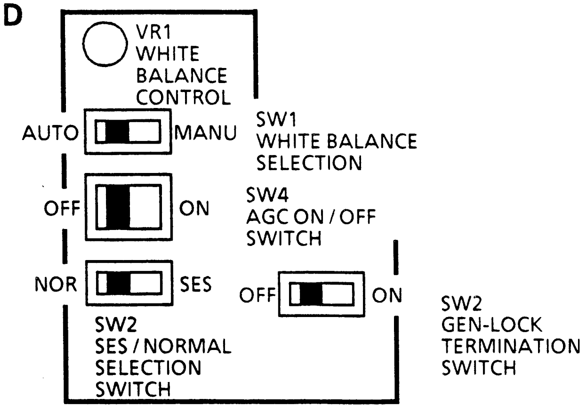

TP9
(R/B)
TP8
(GROUND)
TP5
(+ 1.8V)
TP6
(+ 8.6V)
CN5
D1
Pin 8
(Pattern side)
VR2
SW OSC
ADJ
VR1
+4.9V ADJ
TP7
(+ 6V)
TP4
(+ 4.9V)
TP2
(+ 1.8V)
TP3
(-8V)
TP1
(+ 16V)

GEN-LOCK / SYNC BOARD

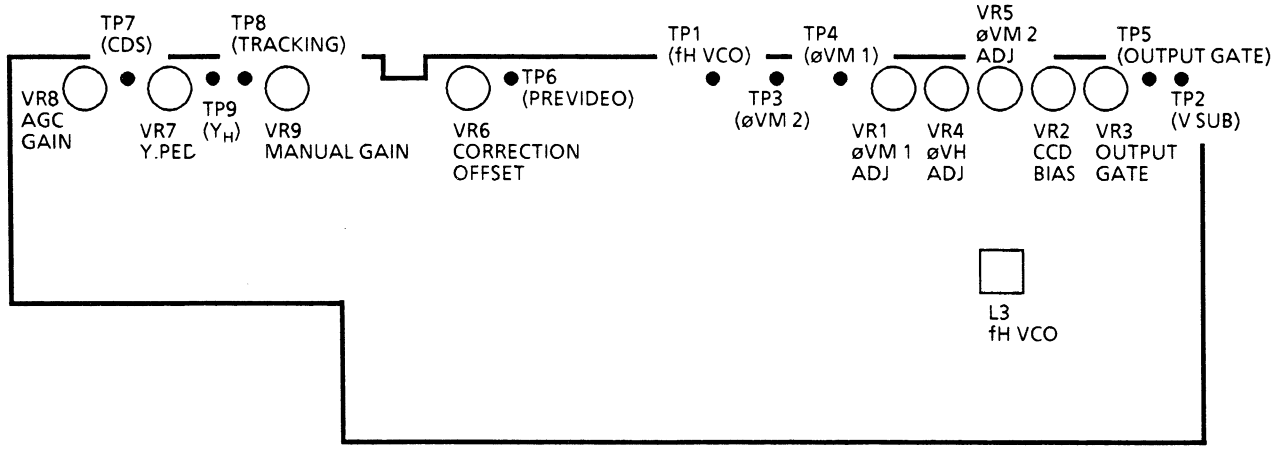

VR1
EXT SC VCO BIAS
TP4
(VBS/VS)
VR2
SC ADJ
VR4
H. PHASE
VR3
SC PHASE FINE
3 1
4 2
SW2 SW1
TP3
(GEN-LOCK)
TP2
(INT SYNC VCO)
L6
GEN-LOCK VCO
L7
INT SYNC VCO
TP1
(EXT SC VCO)
TP5
(GROUND)

SW1:SC PHASE COARSE SWITCH 1
SW2:SC PHASE COARSE SWITCH 2

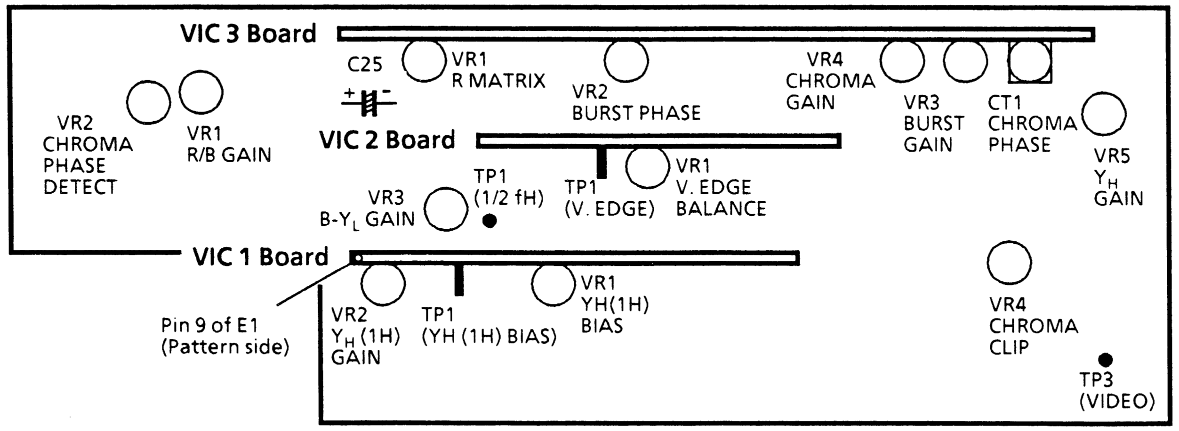
CONTROL BOARD


VR1
WHITE
BALANCE
CONTROL
AUTO
MANU
SW1
WHITE BALANCE
SELECTION
OFF
ON
SW4
AGC ON / OFF
SWITCH
NOR
SES
SW2
SES / NORMAL
SELECTION
SWITCH
OFF
ON
SW2
GEN-LOCK
TERMINATION
SWITCH

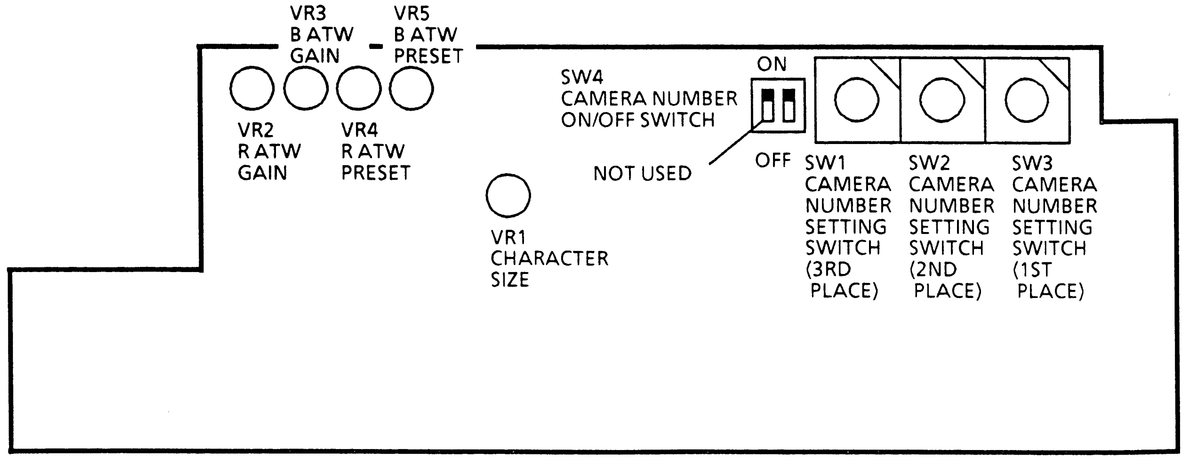
HEAD BOARD


TP7
(CDS)
TP8
(TRACKING)
VR8
AGC
GAIN
VR7
Y.PED
TP9
(Y_H)
VR9
MANUAL GAIN
VR6
CORRECTION
OFFSET
TP6
(PREVIDEO)
TP1
(fH VCO)
TP3
(øVM 2)
TP4
(øVM 1)
VR5
øVM 2
ADJ
TP5
(OUTPUT GATE)
TP2
(V SUB)
VR1
øVM 1
ADJ
VR4
øVH
ADJ
VR2
CCD
BIAS
VR3
OUTPUT
GATE
L3
fH VCO

PROCESS BOARD


VIC 3 Board
C25
VR1
R MATRIX
VR2
BURST PHASE
VR4
CHROMA
GAIN
VR3
BURST
GAIN
CT1
CHROMA
PHASE
VR5
Y_H
GAIN
VR2
CHROMA
PHASE
DETECT
VR1
R/B GAIN
VIC 2 Board
VR3
B-Y_L GAIN
TP1
(1/2 fH)
TP1
(V. EDGE)
VR1
V. EDGE
BALANCE
VIC 1 Board
Pin 9 of E1
(Pattern side)
VR2
Y_H (1H)
GAIN
TP1
(YH (1H) BIAS)
VR1
YH(1H)
BIAS
VR4
CHROMA
CLIP
TP3
(VIDEO)

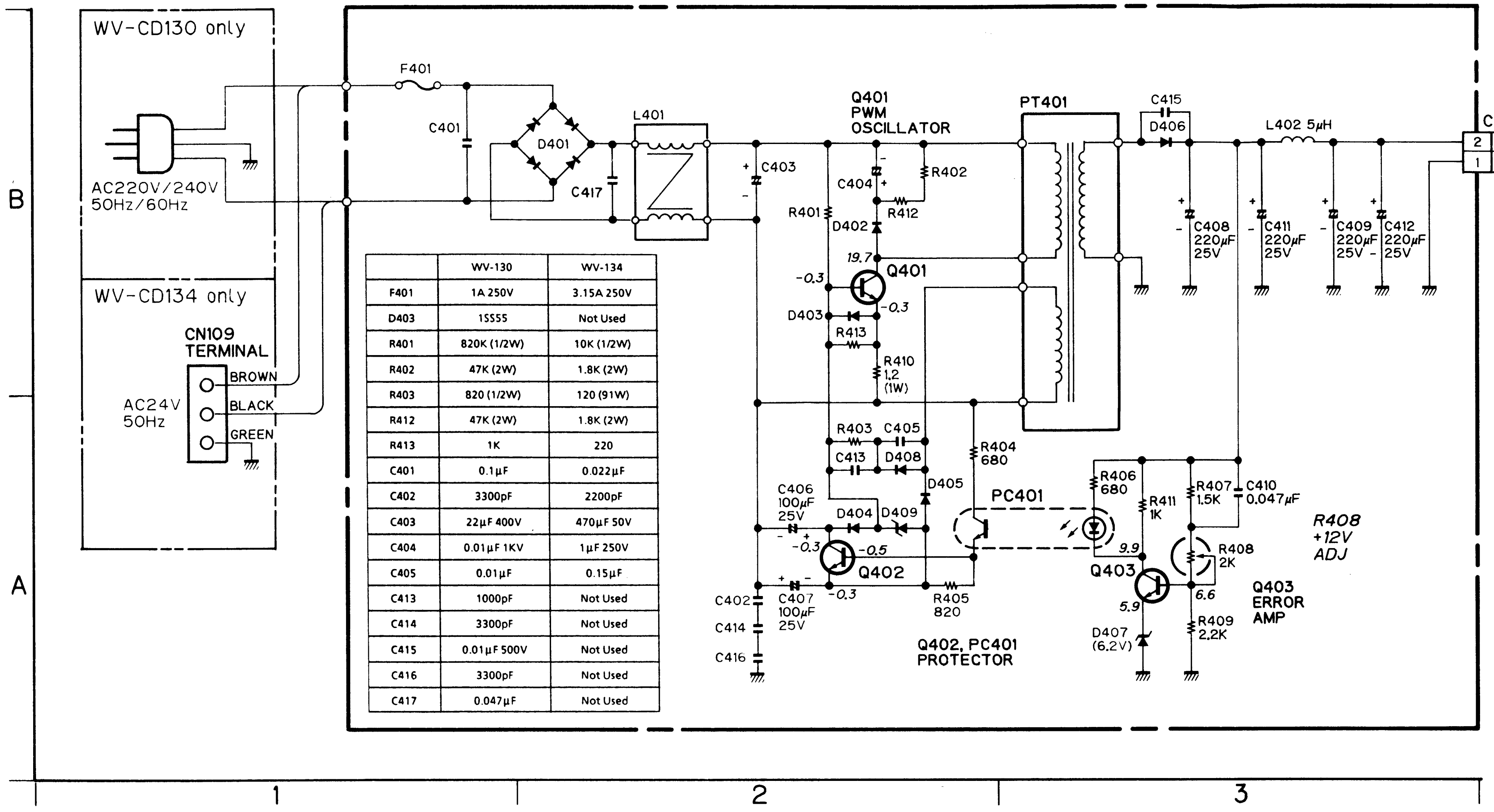
MICROPROCESSOR BOARD


VR3
B ATW
GAIN
VR5
B ATW
PRESET
VR2
R ATW
GAIN
VR4
R ATW
PRESET
SW4
CAMERA NUMBER
ON/OFF SWITCH
ON
OFF
NOT USED
VR1
CHARACTER
SIZE
SW1
CAMERA
NUMBER
SETTING
SWITCH
(3RD
PLACE)
SW2
CAMERA
NUMBER
SETTING
SWITCH
(2ND
PLACE)
SW3
CAMERA
NUMBER
SETTING
SWITCH
(1ST
PLACE)

SCHEMATIC DIAGRAM OF POWER BOARD

CONDUCTO

POWER BOARD



WV-CD130 only
AC220V/240V
50Hz/60Hz
WV-CD134 only
CN109
TERMINAL
AC24V
50Hz
BROWN
BLACK
GREEN
F401
C401
D401
C417
L401
C403
Q401
PWM
OSCILLATOR
C404
R402
R401
R412
D402
19.7
-0.3
Q401
D403
-0.3
R413
R410
1.2
(1W)
PT401
C415
D406
L402 5μH
C408
220μF
25V
C411
220μF
25V
C409
220μF
25V
C412
220μF
25V
CN401
2
+12V OUT
1
GROUND
TO
MOTHER
BOARD
... CN9
R403
C405
C413
D408
R404
680
D405
PC401
C406
100μF
25V
D404
D409
-0.3
-0.5
Q402
-0.3
C407
100μF
25V
R405
820
C402
C414
C416
Q402, PC401
PROTECTOR
R406
680
R411
1K
R407
1.5K
C410
0.047μF
9.9
Q403
R408
2K
R408
+12V
ADJ
5.9
6.6
R409
2.2K
Q403
ERROR
AMP
D407
(6.2V)
B
A
1
2
3

	WV-130	WV-134
F401	1A 250V	3.15A 250V
D403	1SS55	Not Used
R401	820K (1/2W)	10K (1/2W)
R402	47K (2W)	1.8K (2W)
R403	820 (1/2W)	120 (91W)
R412	47K (2W)	1.8K (2W)
R413	1K	220
C401	0.1μF	0.022μF
C402	3300pF	2200pF
C403	22μF 400V	470μF 50V
C404	0.01μF 1KV	1μF 250V
C405	0.01μF	0.15μF
C413	1000pF	Not Used
C414	3300pF	Not Used
C415	0.01μF 500V	Not Used
C416	3300pF	Not Used
C417	0.047μF	Not Used

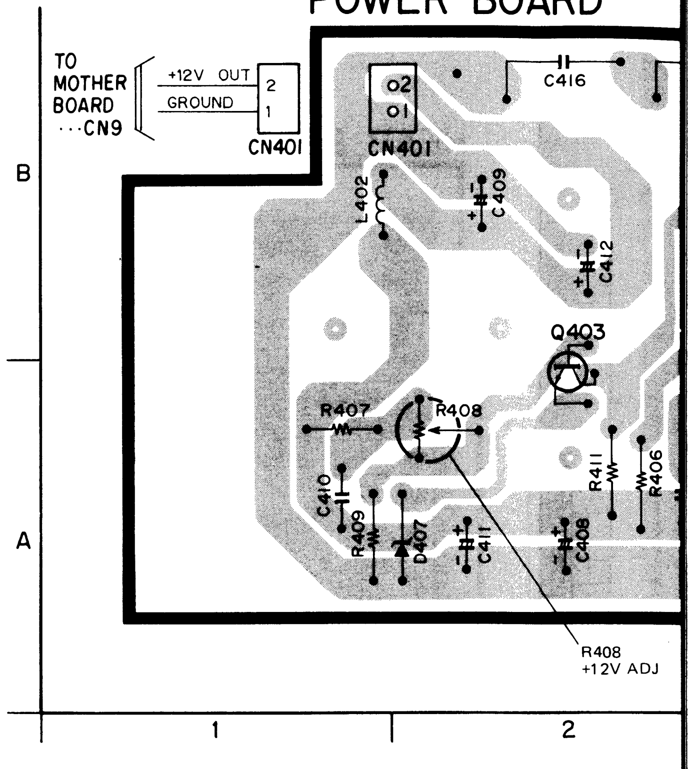
Power Board for WV-CD130

Q401	2SC3549	B2
Q402	2SC1815	A2
Q403	2SC1815	A3
D401	S1VB60	B2
D402	RU1P	B2
D403	1SS55	B2
D404	1SS55	A2
D405	EM1Z	A2
D406	ERB84-009	B3
D407	RD6.2EB1	A3
D408	ERB44-02	A2
D409	RD7.5EB3	A2

Power Board for WV-CD134

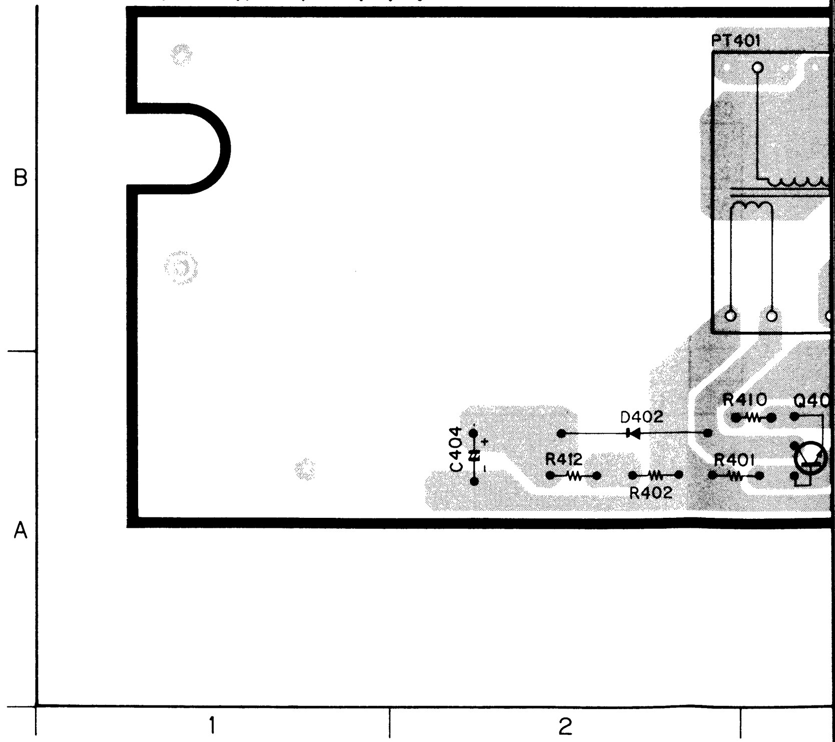
Q401	2SC2334-K	B2
Q402	2SD471	A2
Q403	2SC1815	A3
D401	D2SB40	B2
D402	ES1A	B2
D404	ERB44-02	A2
D405	1SS55	A2
D406	ERB84-009	B3
D407	RD6.2EB1	A3
D408	ERB44-02	A2
D409	RD5.6EB1	A2

POWER BOARD



TO
MOTHER
BOARD
...CN9
+12V OUT
GROUND
2
1
CN401
C416
CN401
L402
C409
C412
Q403
R407
R408
R411
R406
C410
R409
D407
C411
C408
R408
+12V ADJ
B
A
1
2

POWER BOARD



PT401
D402
R410
C404
R412
R402
R401
B
A
1
2

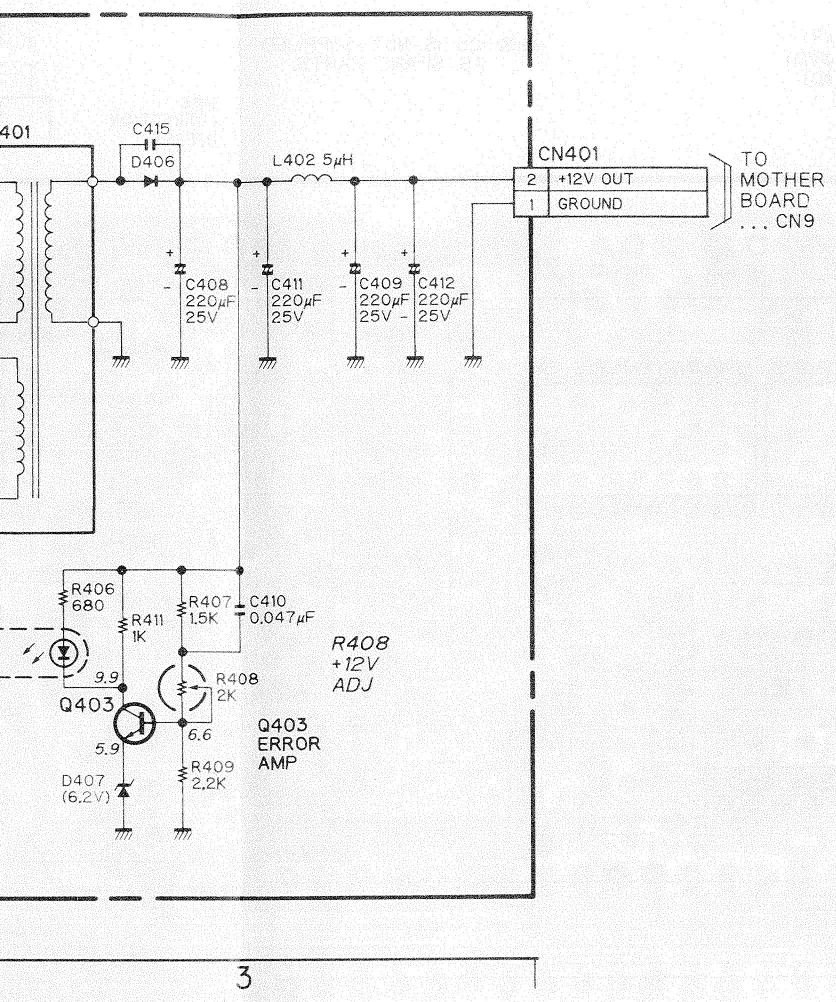
Power Board for WV-CD130

Q401	2SC3549	B4
Q402	2SC1815	B3
Q403	2SC1815	A2
D401	S1VB60	A5
D402	RU1P	A4
D403	1SS55	A4
D404	1SS55	B3
D405	EM1Z	B3
D406	ERB84-009	A2
D407	RD6.2EB1	A1
D408	ERB44-02	B3
D409	RD7.5EB3	B3

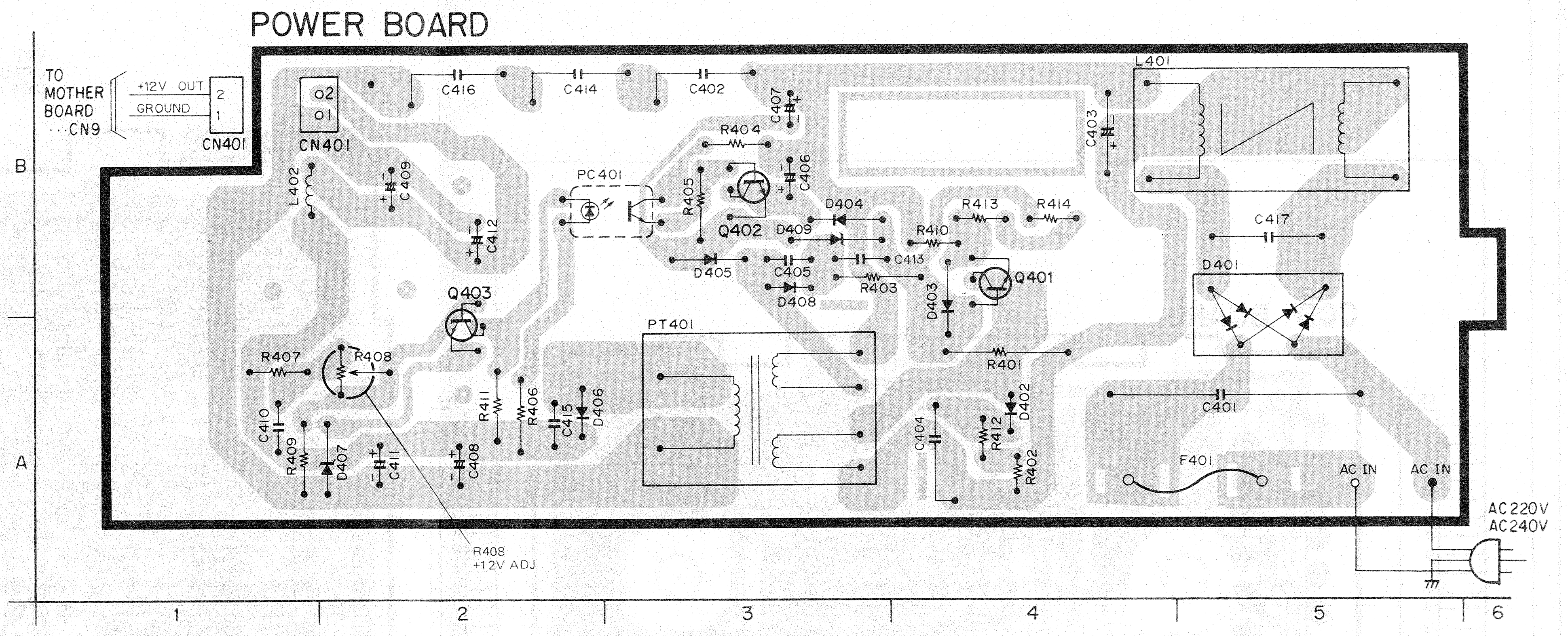
Power Board for WV-CD134

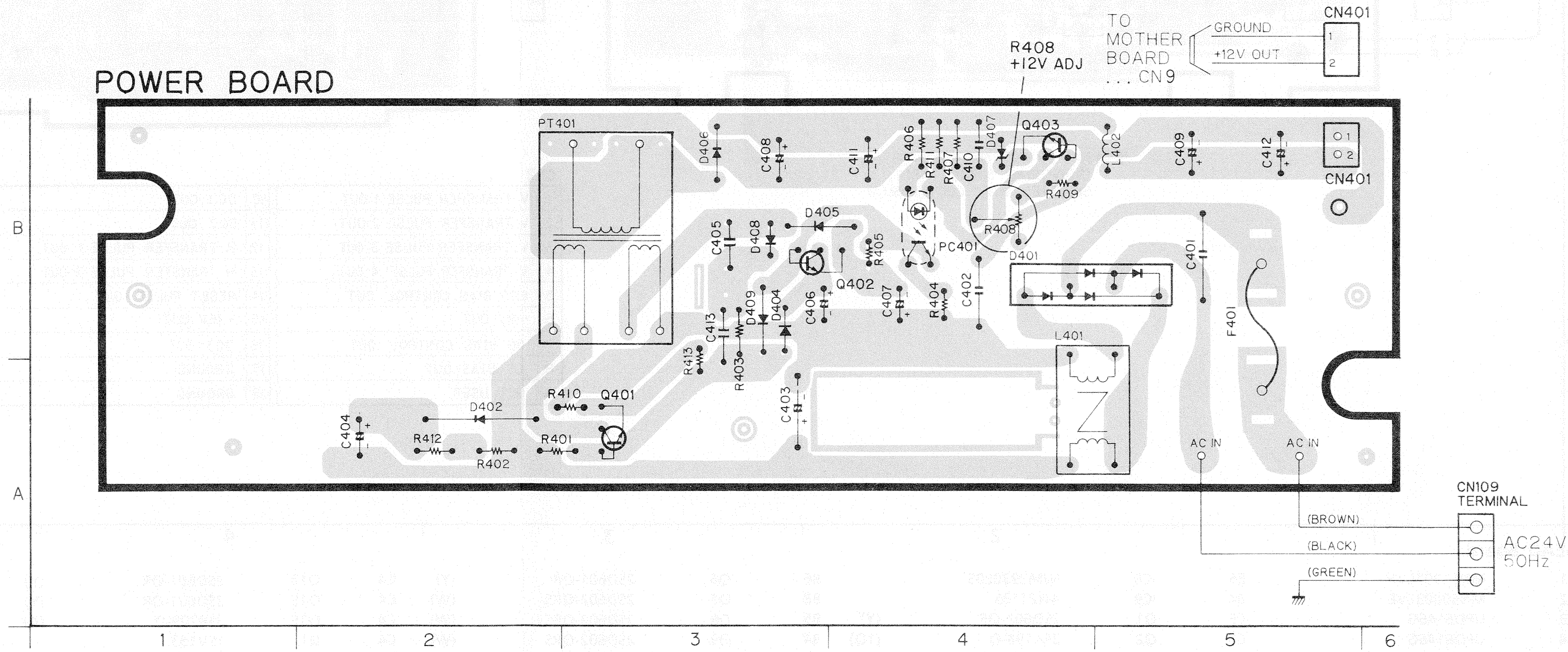
Q401	2SC2334-K	A3
Q402	2SD471	B3
Q403	2SC1815	B4
D401	D2SB40	B4, B5
D402	ES1A	B3
D404	ERB44-02	B3
D405	1SS55	B4
D406	ERB84-009	B3
D407	RD6.2EB1	B4
D408	ERB44-02	B3
D409	RD5.6EB1	A3

R BOARD


C415
D406
L402 5μH
CN401
2 +12V OUT
1 GROUND
TO MOTHER BOARD ... CN9
C408 220μF 25V
C411 220μF 25V
C409 220μF 25V
C412 220μF 25V
R406 680
R411 1K
R407 1.5K
C410 0.047μF
R408 +12V ADJ
R408 2K
9.9
6.6
5.9
Q403
Q403 ERROR AMP
R409 2.2K
D407 (6.2V)
3

CONDUCTOR VIEW OF POWER BOARD


POWER BOARD
TO MOTHER BOARD ...CN9
+12V OUT
GROUND
2
1
CN401
C416
C414
C402
C407
C403
L401
R404
PC401
R405
C406
C409
C412
L402
Q402
D404
D409
R413
R414
R410
C417
D405
C405
C413
R403
D408
Q401
D403
D401
Q403
PT401
R407
R408
R401
R411
R406
C415
D406
C410
R409
D407
C411
C408
C404
R412
D402
R402
C401
F401
AC IN
AC IN
AC220V
AC240V
R408 +12V ADJ
B
A
1
2
3
4
5
6


POWER BOARD
R408 +12V ADJ
TO MOTHER BOARD ... CN9
GROUND
+12V OUT
CN401
1
2
PT401
D406
C408
C411
R406
R411
R407
C410
D407
Q403
L402
C409
C412
R409
D405
C405
D408
R405
R408
PC401
D401
C401
Q402
D409
D404
C406
C407
R404
C402
C413
R413
R403
F401
L401
C403
D402
R410
Q401
C404
R412
R401
R402
AC IN
AC IN
CN109 TERMINAL
(BROWN)
(BLACK)
(GREEN)
AC24V 50Hz
B
A
1
2
3
4
5
6

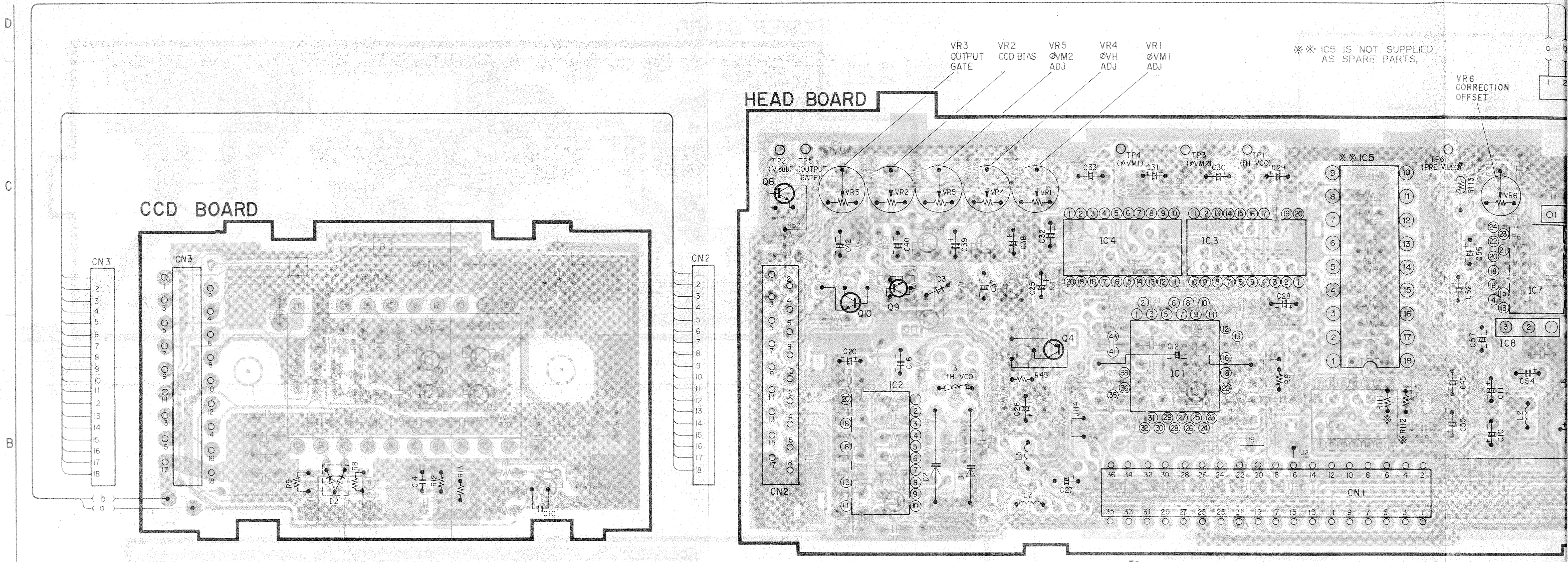
Power Board for WV-CD130

Q401	2SC3549	B4
Q402	2SC1815	B3
Q403	2SC1815	A2
D401	S1VB60	A5
D402	RU1P	A4
D403	1SS55	A4
D404	1SS55	B3
D405	EM1Z	B3
D406	ERB84-009	A2
D407	RD6.2EB1	A1
D408	ERB44-02	B3
D409	RD7.5EB3	B3

Power Board for WV-CD134

Q401	2SC2334-K	A3
Q402	2SD471	B3
Q403	2SC1815	B4
D401	D2SB40	B4, B5
D402	ES1A	B3
D404	ERB44-02	B3
D405	1SS55	B4
D406	ERB84-009	B3
D407	RD6.2EB1	B4
D408	ERB44-02	B3
D409	RD5.6EB1	A3

CONDUCTOR VIEW OF HEAD BOARD


D
C
B
A
HEAD BOARD
CCD BOARD
VR3 OUTPUT GATE
VR2 CCD BIAS
VR5 ØVM2 ADJ
VR4 ØVH ADJ
VR1 ØVM1 ADJ
VR6 CORRECTION OFFSET
TP2 (V sub)
TP5 (OUTPUT GATE)
TP4 (ØVM1)
TP3 (ØVM2)
TP1 (fH VCO)
TP6 (PRE VIDEO)
※※IC5
IC1
IC2
IC3
IC4
IC6
IC7
IC8
※※IC2
CN1
CN2
CN3
b
a

※※ IC5 IS NOT SUPPLIED AS SPARE PARTS.

※※ IC2 IS NOT SUPPLIED AS INDIVIDUAL SPARE PASTS, SUPPLIED WITH CCD KIT(M17)

CN2

1	V.TRANSFER PULSE 1 OUT	10	DC1 OUT
2	V.TRANSFER PULSE 2 OUT	11	DC2 OUT
3	V.TRANSFER PULSE 3 OUT	12	H.TRANSFER PULSE 1 OUT
4	V.TRANSFER PULSE 4 OUT	13	H.TRANSFER PULSE 3 OUT
5	CCD BIAS CONTROL OUT	14	RESET PULSE OUT
6	−8V OUT	15	+16V OUT
7	OG BIAS CONTROL OUT	16	DC3 OUT
8	LG BIAS OUT	17	GROUND
9	NOT USED	18	GROUND

TO
MOTHER BOARD

CN1

36	CP3 OUT	24	Vp IN	12	GROUND
35	+16V IN	23	+8.6V IN	11	GAIN CONTR
34	BL IN	22	1/2fH PULSE OUT	10	GROUND
33	−8V IN	21	PREVIDEO OUT	9	AIC VIDEO
32	CP5 OUT	20	SES CONTROL IN	8	GROUND
31	GROUND	19	AGC CONTROL OUT	7	WHD/WBL
30	GROUND	18	APERTURE SIGNAL IN	6	+4.9V IN
29	NOT USED	17	MANUAL CONTROL OUT	5	LOW LIGHT
28	R SC OUT	16	GROUND	4	+8.6V IN
27	NOT USED	15	YH OUT	3	AGC DC OU
26	WHD IN	14	GROUND	2	+1.8V IN
25	GROUND	13	NOT USED	1	+4.9V IN

1 2 3 4 5 6

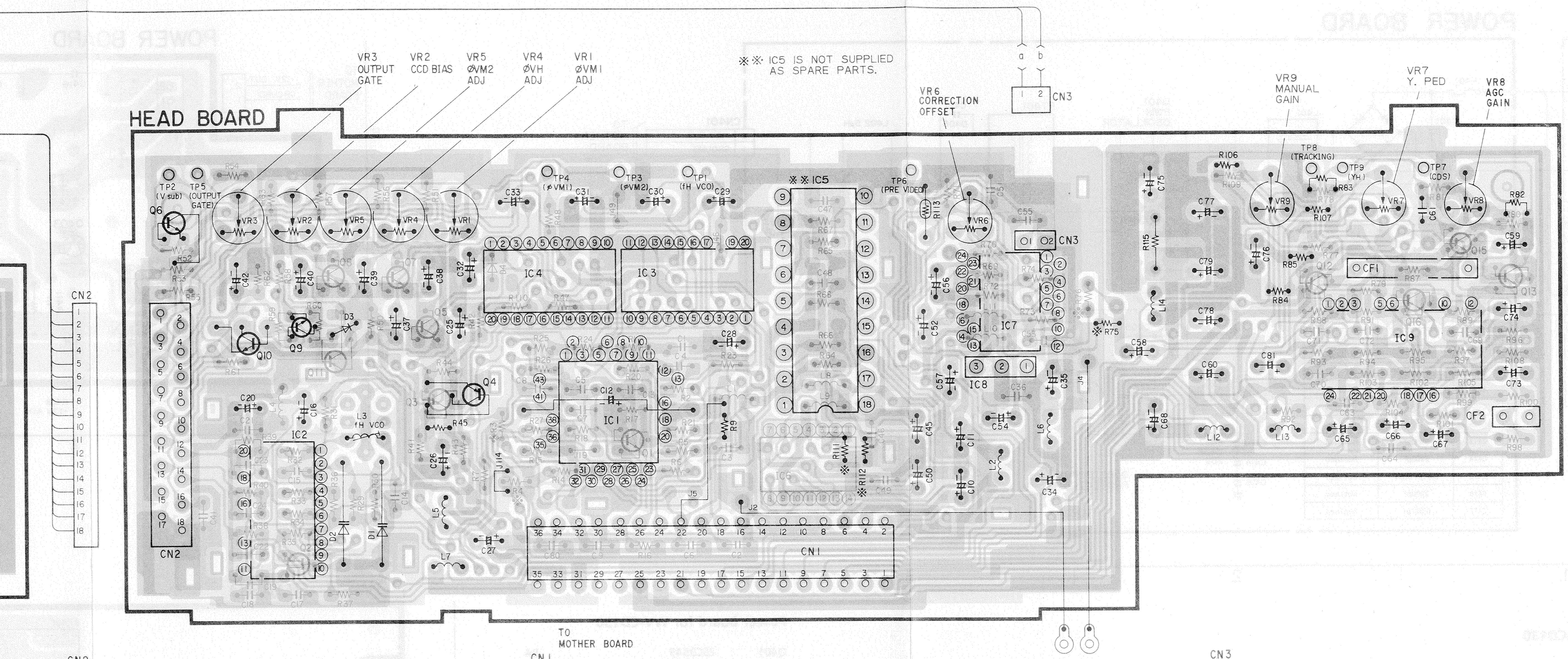
HEAD Board

IC1	MN51007LVH	B5	IC8	NJM2930L05		B6	Q6	2SD601-QR	(Y)	C4	Q13	2SD601-QR	(Y)	C8
IC2	MN50003LVE	B4	IC9	AN2110S		B8	Q7	2SD602-QRS	(W)	C4	Q15	2SD601-QR	(Y)	C8
IC3	UPD6146G	C5	Q1	2SD601-QR	(Y)	B5	Q8	2SD602-QRS	(W)	C4	Q16	2SB709-Q	(A)	C8
IC4	UPD6146G	C5	Q2	2SK198-Q	(1Q)	B4	Q9	2SD602-QRS	(W)	C4	D1	1SV153		B4
IC5	YFVAKA0497AN	C6	Q3	2SA1022-C	(E)	B4	Q10	2SD973A-RS		B4	D2	1SV153		B4
IC6	MN74HC08S	B6	Q4	2SA1022-C	(E)	B5	Q11	2SB710-Q	(C)	B4	D3	MA151K	(MH)	C4
IC7	M51266FP	C7	Q5	2SD602-QRS	(W)	C4	Q12	2SC2404-CDTW	(U)	C8	D4	MA151K	(MH)	C5

CCD Board

IC1	CXB0026M		B2	Q5	2SA1022-C
Q1	2SC2404-CDTW	(U)	B2	D1	MA151K
Q2	2SA1022-C	(E)	B3	D2	MA151WA
Q3	2SC2404-CDTW	(U)	B2		
Q4	2SC2404-CDTW	(U)	B2		

CONDUCTOR VIEW OF HEAD BOARD


HEAD BOARD
VR3 OUTPUT GATE
VR2 CCD BIAS
VR5 ØVM2 ADJ
VR4 ØVH ADJ
VR1 ØVM1 ADJ
VR6 CORRECTION OFFSET
VR9 MANUAL GAIN
VR7 Y. PED
VR8 AGC GAIN
TP2 (V sub)
TP5 (OUTPUT GATE)
TP4 (ØVM1)
TP3 (ØVM2)
TP1 (fH VCO)
TP6 (PRE VIDEO)
TP8 (TRACKING)
TP9 (YH)
TP7 (CDS)
※※IC5
IC1
IC2
IC3
IC4
IC6
IC7
IC8
IC9
L3 fH VCO
CF1
CF2
CN1
CN2
CN3
a
b
TO MOTHER BOARD

※※ IC5 IS NOT SUPPLIED AS SPARE PARTS.

CN2

1	V.TRANSFER PULSE 1 OUT	10	DC1 OUT
2	V.TRANSFER PULSE 2 OUT	11	DC2 OUT
3	V.TRANSFER PULSE 3 OUT	12	H.TRANSFER PULSE 1 OUT
4	V.TRANSFER PULSE 4 OUT	13	H.TRANSFER PULSE 3 OUT
5	CCD BIAS CONTROL OUT	14	RESET PULSE OUT
6	-8V OUT	15	+16V OUT
7	OG BIAS CONTROL OUT	16	DC3 OUT
8	LG BIAS OUT	17	GROUND
9	NOT USED	18	GROUND

CN1

36	CP3 OUT	24	Vp IN	12	GROUND
35	+16V IN	23	+8.6V IN	11	GAIN CONTROL IN
34	BL IN	22	1/2 fH PULSE OUT	10	GROUND
33	-8V IN	21	PREVIDEO OUT	9	AIC VIDEO OUT
32	CP5 OUT	20	SES CONTROL IN	8	GROUND
31	GROUND	19	AGC CONTROL OUT	7	WHD/WBL IN
30	GROUND	18	APERTURE SIGNAL IN	6	+4.9V IN
29	NOT USED	17	MANUAL CONTROL OUT	5	LOW LIGHT INF OUT
28	R SC OUT	16	GROUND	4	+8.6V IN
27	NOT USED	15	YH OUT	3	AGC DC OUT
26	WHD IN	14	GROUND	2	+1.8V IN
25	GROUND	13	NOT USED	1	+4.9V IN

CN3

1	PREVIDEO IN
2	GROUND

—W— COMPONENT SIDE
—W— PATTERN SIDE

3 4 5 6 7 8

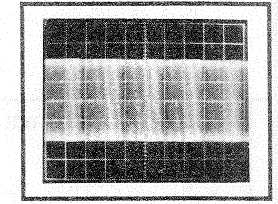
2SD601-QR	(Y)	C4	Q13	2SD601-QR	(Y)	C8
2SD602-QRS	(W)	C4	Q15	2SD601-QR	(Y)	C8
2SD602-QRS	(W)	C4	Q16	2SB709-Q	(A)	C8
2SD602-QRS	(W)	C4	D1	1SV153		B4
2SD973A-RS		B4	D2	1SV153		B4
2SB710-Q	(C)	B4	D3	MA151K	(MH)	C4
2SC2404-CDTW	(U)	C8	D4	MA151K	(MH)	C5

CCD Board

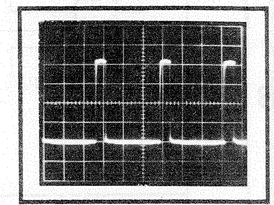
IC1	CXB0026M		B2	Q5	2SA1022-C	(E)	B2
Q1	2SC2404-CDTW	(U)	B2	D1	MA151K	(MH)	B3
Q2	2SA1022-C	(E)	B3	D2	MA151WA	(MN)	B2
Q3	2SC2404-CDTW	(U)	B2				
Q4	2SC2404-CDTW	(U)	B2				

	CCD image sensor without IC5 on Head board	CCD image sensor with IC5 on Head board
R3	Not Used	1K ohms
R4	Not Used	1K ohms
R75	0 ohm	Not Used
R76	Not Used	0 ohm
R111	1K ohms	Not Used
R112	1K ohms	Not Used

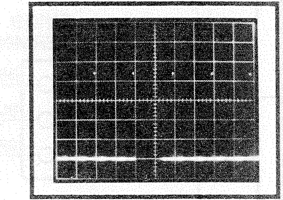
1. 0.2V/DIV, 5ms/DIV



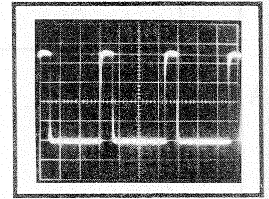
2. 0.1V/DIV, 20μs/DIV



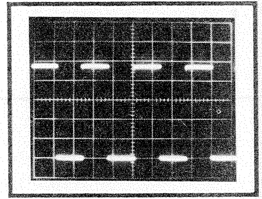
3. 0.1V/DIV, 10μs/DIV



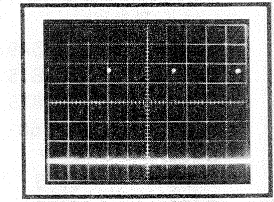
4. 0.1/DIV, 20μs/DIV



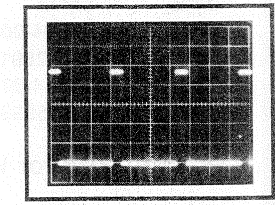
5. 0.1V/DIV, 20μs/DIV



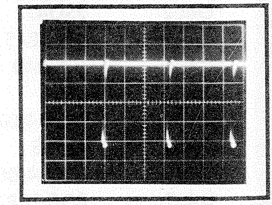
6. 0.1V/DIV, 20μs/DIV



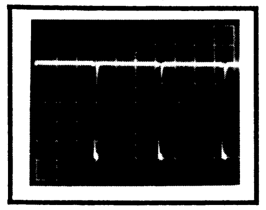
7. 0.1V/DIV, 20μs/DIV



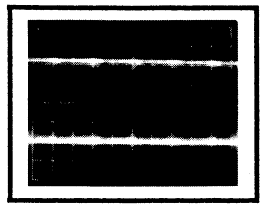
8. 0.2V/DIV, 20μs/DIV



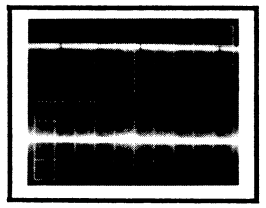
9. 0.2V/DIV, 20µs/DIV



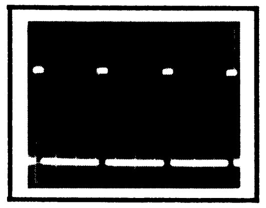
10. 0.2V/DIV, 5ms/DIV



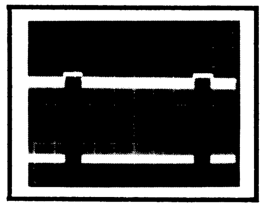
11. 0.2V/DIV, 5ms/DIV



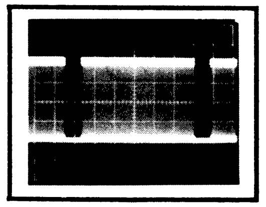
12. 0.1V/DIV, 20µs/DIV



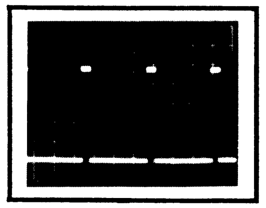
13. 0.1V/DIV, 10µs/DIV



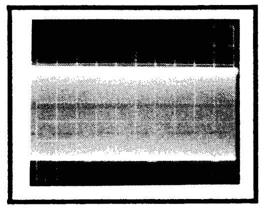
14. 0.1V/DIV, 10µs/DIV



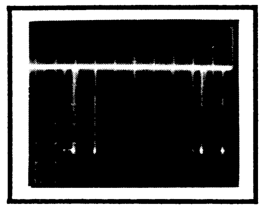
15. 0.1V/DIV, 20µs/DIV



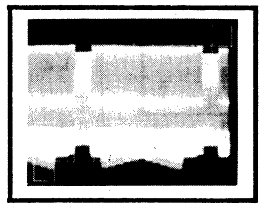
16. 0.1V/DIV, 20µs/DIV



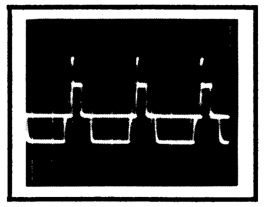
17. 0.1V/DIV, 10µs/DIV



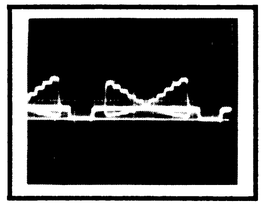
18. 20mV/DIV, 10µs/DIV



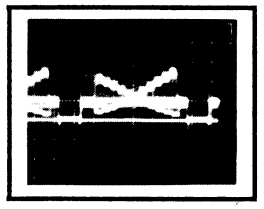
19. 0.1V/DIV, 20µs/DIV



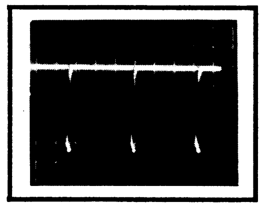
20. 20mV/DIV, 10µs/DIV



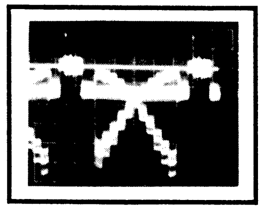
21. 20mV/DIV, 10µs/DIV



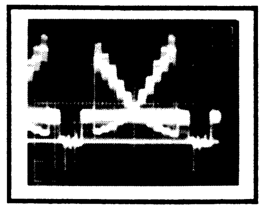
22. 2V/DIV, 20µs/DIV



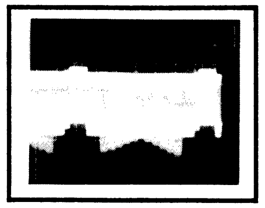
23. 50mV/DIV, 10µs/DIV



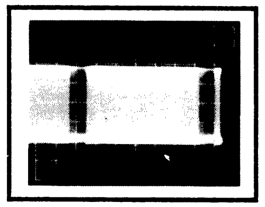
24. 50mV/DIV, 10µs/DIV



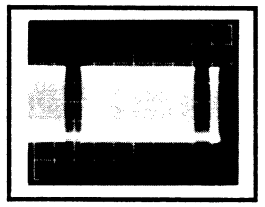
25. 0.2V/DIV, 10µs/DIV



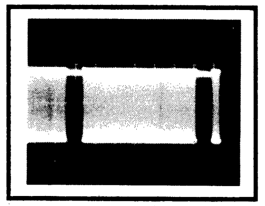
26. 2V/DIV, 10µs/DIV



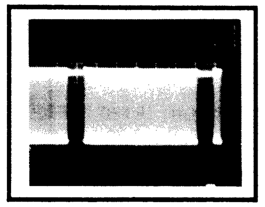
27. 2V/DIV, 10µs/DIV



28. 2V/DIV, 10µs/DIV



29. 2V/DIV, 10µs/DIV



	IC1	IC2	IC3	IC4	IC6	IC7	IC8	IC9
Pin 1	0.2	-0.9	0	-6.5	-9.1	0	8.6	1.9
2	0.3	2.2	-5.0	2.4	4.7	2.5	0	1.8
3	4.2	2.2	3.1	3.1	-94.0	0	5.0	1.8
4	4.3	-20.3	0	0	-37.4	-9.8		1.8
5	4.7	-56.3	2.7	-6.5	4.6	4.7		1.8
6	4.6	-58.0	4.7	4.7	-104.1	-7.1		2.3
7	0	-22.0	0	0	0	2.4		0
8	0	1.1	0.2	0	-97.0	2.5		0
9	0.1	1.2	4.7	0	4.6	4.7		1.9
10	0.1	0	0	0.3	-103.5	2.7		1.9
11	0	0	0	4.3	-96.8	0		0
12	4.6	0	4.6	0.3	4.6	2.5		4.7
13	0	0	0	0.3	0	4.7		1.9
14	0	-2.0	0	0	4.6			2.6
15	0.3	1.6	0	0		—		3.1
16	4.7	0	13.3	13.3		0		1.7
17	4.7	2.1	0	0		0		1.9
18	4.7	0.6	-4.3	-6.5		-111		2.6
19	2.3	4.7	3.1	3.1		-111		2.0
20	4.7	4.7	-5.0	-5.9		4.7		2.0
21	0					4.9		0.1
22	4.6					0		1.3
23	0.7					0		0
24	0					2.4		1.8
25	1.2							
26	2.3							
27	2.3							
28	2.3							
29	2.3							
30	-11.6							
31	-11.1							
32	-11.1							
33	-10.6							
34	0							
35	0							
36	0.2							
37	0							
38	0.7							
39	0							
40	0							
41	2.2							
42	0.6							
43	0.7							
44	0.7							

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q15	Q16
B	2.0	G 0.7	-5.7	-7.3	3.6	11.4	13.9	3.7	0	8.4	7.7	1.5	3.8	3.7	3.1
C	4.9	D 4.6	-8.0	-7.4	16.0	15.6	16.0	0	15.5	8.6	0	4.0	8.6	8.6	0
E	1.5	S 3.0	-5.0	-6.5	3.0	10.9	13.2	3.1	11.7	7.7	8.3	0.9	3.2	3.1	3.8

CCD Board

	IC1	IC2
Pin 1	0	---
2	0.8	16.0
3	0	3.1
4	0.6	9.1
5	4.6	16.0
6	7.7	6.9
7	4.8	4.8
8	0	10.1
9		2.3
10		4.6
11		-8.0
12		0
13		10.9
14		16.0
15		-5.9
16		-4.3
17		2.4
18		2.7
19		0
20		0

	Q1	Q2	Q3	Q4	Q5
B	9.1	11.9	0.6	---	---
C	16.0	---	---	11.7	0
E	8.5	11.7	0	---	---

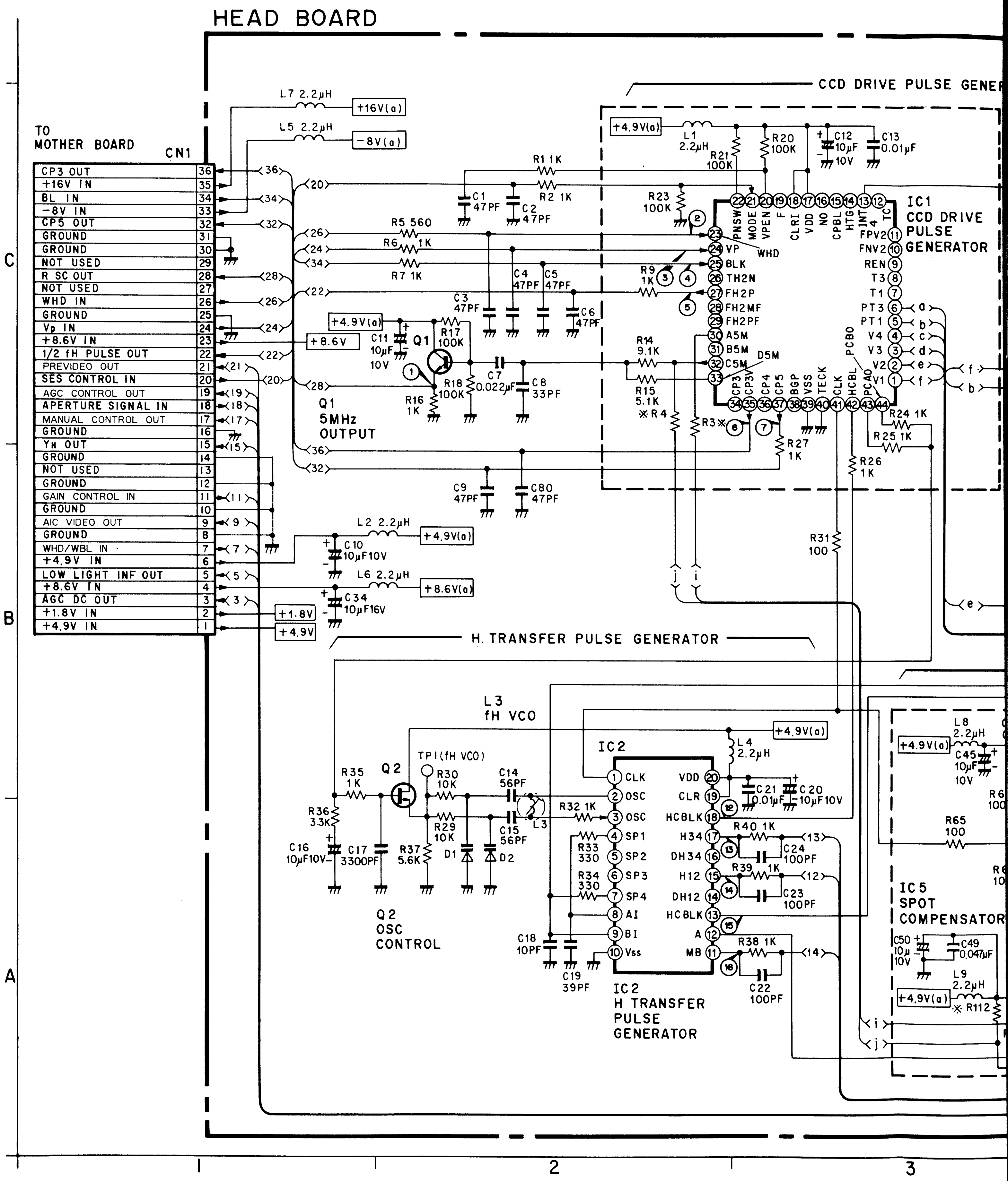
	CCD image sensor without IC5 on Head board	CCD image sensor with IC5 on Head board
R3	Not Used	1K ohms
R4	Not Used	1K ohms
R75	0 ohm	Not Used
R76	Not Used	0 ohm
R111	1K ohms	Not Used
R112	1K ohms	Not Used

Head Board

IC1	MN51007LVH		C3
IC2	MN50003LVE		A2
IC3	UPD6146G		C4
IC4	UPD6146G		B4
IC5	YFVAKA0497AN		A4
IC6	MN74HC08S		A4
IC7	M51266FP		A5
IC8	NJM2930L05		A5
IC9	AN2110S		B7
Q1	2SD601-QR	(Y)	C2
Q2	2SK198-Q	(1Q)	B2
Q3	2SA1022-C	(E)	C4
Q4	2SA1022-C	(E)	C4
Q5	2SD602-QRS	(W)	C5
Q6	2SD601-QR	(Y)	C5
Q7	2SD602-QRS	(W)	C5
Q8	2SD602-QRS	(W)	C5
Q9	2SD602-QRS	(W)	B5
Q10	2SD973A-RS		B5
Q11	2SB710-Q	(C)	B5
Q12	2SC2404-CDTW	(U)	A6
Q13	2SD601-QR	(Y)	A7
Q15	2SD601-QR	(Y)	A7
Q16	2SB709-Q	(A)	A7
D1	1SV153		A2
D2	1SV153		A2
D3	MA151K	(MH)	C5
D4	MA151K	(MH)	C5

CCD Board

IC1	CXB0026M		C8
IC2	YFVAKA0497AN		C7
Q1	2SC2404-CDTW	(U)	C7
Q2	2SA1022-C	(E)	C8
Q3	2SC2404-CDTW	(U)	C8
Q4	2SC2404-CDTW	(U)	C8
Q5	2SA1022-C	(E)	C8
D1	MA151K	(MH)	C8
D2	MA151WA	(MN)	C7


HEAD BOARD
CCD DRIVE PULSE GENER
TO MOTHER BOARD
CN1
CP3 OUT 36
+16V IN 35
BL IN 34
−8V IN 33
CP5 OUT 32
GROUND 31
GROUND 30
NOT USED 29
R SC OUT 28
NOT USED 27
WHD IN 26
GROUND 25
Vp IN 24
+8.6V IN 23
1/2 fH PULSE OUT 22
PREVIDEO OUT 21
SES CONTROL IN 20
AGC CONTROL OUT 19
APERTURE SIGNAL IN 18
MANUAL CONTROL OUT 17
GROUND 16
YH OUT 15
GROUND 14
NOT USED 13
GROUND 12
GAIN CONTROL IN 11
GROUND 10
AIC VIDEO OUT 9
GROUND 8
WHD/WBL IN 7
+4.9V IN 6
LOW LIGHT INF OUT 5
+8.6V IN 4
AGC DC OUT 3
+1.8V IN 2
+4.9V IN 1
L7 2.2µH
+16V(a)
L5 2.2µH
−8V(a)
+4.9V(a)
+8.6V
Q1 5MHz OUTPUT
IC1 CCD DRIVE PULSE GENERATOR
PNSW MODE VPEN F CLRI VDD NO CPBL HTG INT 4 TC
VP BLK TH2N FH2P FH2MF FH2PF A5M B5M C5M D5M
FPV2 FNV2 REN T3 T1 PT3 PT1 V4 V3 V2 V1
CP3 CP3V CP4 CP5 BGP VSS TECK CLK HCBL PCAO PCBO
WHD
L2 2.2µH
C10 10µF10V
L6 2.2µH
+8.6V(a)
C34 10µF16V
+1.8V
+4.9V
H. TRANSFER PULSE GENERATOR
L3 fH VCO
TP1(fH VCO)
Q2 OSC CONTROL
IC2 H TRANSFER PULSE GENERATOR
CLK OSC OSC SP1 SP2 SP3 SP4 AI BI Vss
VDD CLR HCBLK H34 DH34 H12 DH12 HCBLK A MB
L4 2.2µH
IC5 SPOT COMPENSATOR
L8 2.2µH
L9 2.2µH
※R112
※R4
R3※
A
B
C
1
2
3

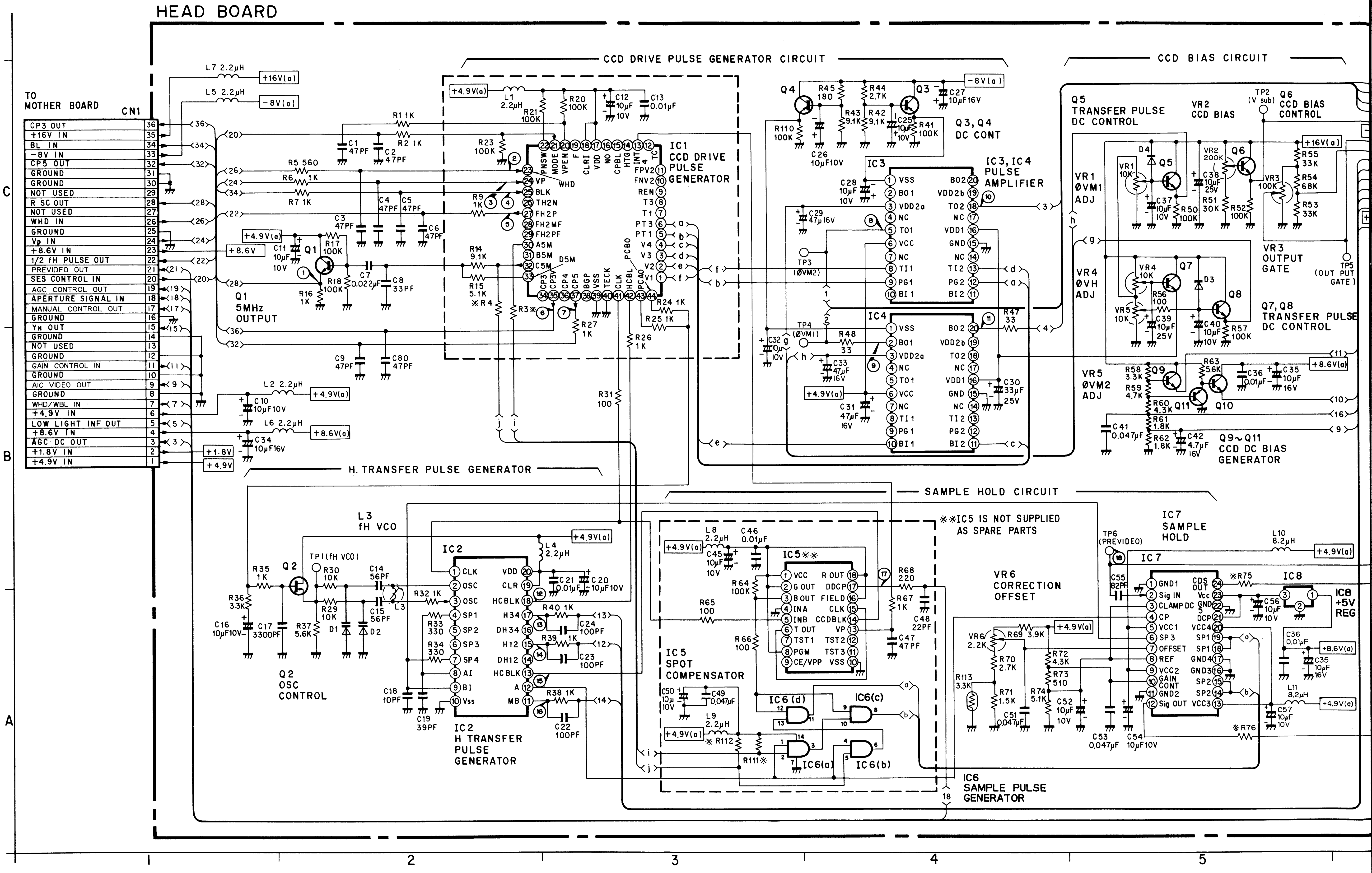
IC9
1.9
1.8
1.8
1.8
1.8
2.3
0
0
1.9
1.9
0
4.7
1.9
2.6
3.1
1.7
1.9
2.6
2.0
2.0
0.1
1.3
0
1.8

Q10	Q11	Q12	Q13	Q15	Q16
8.4	7.7	1.5	3.8	3.7	3.1
8.6	0	4.0	8.6	8.6	0
7.7	8.3	0.9	3.2	3.1	3.8

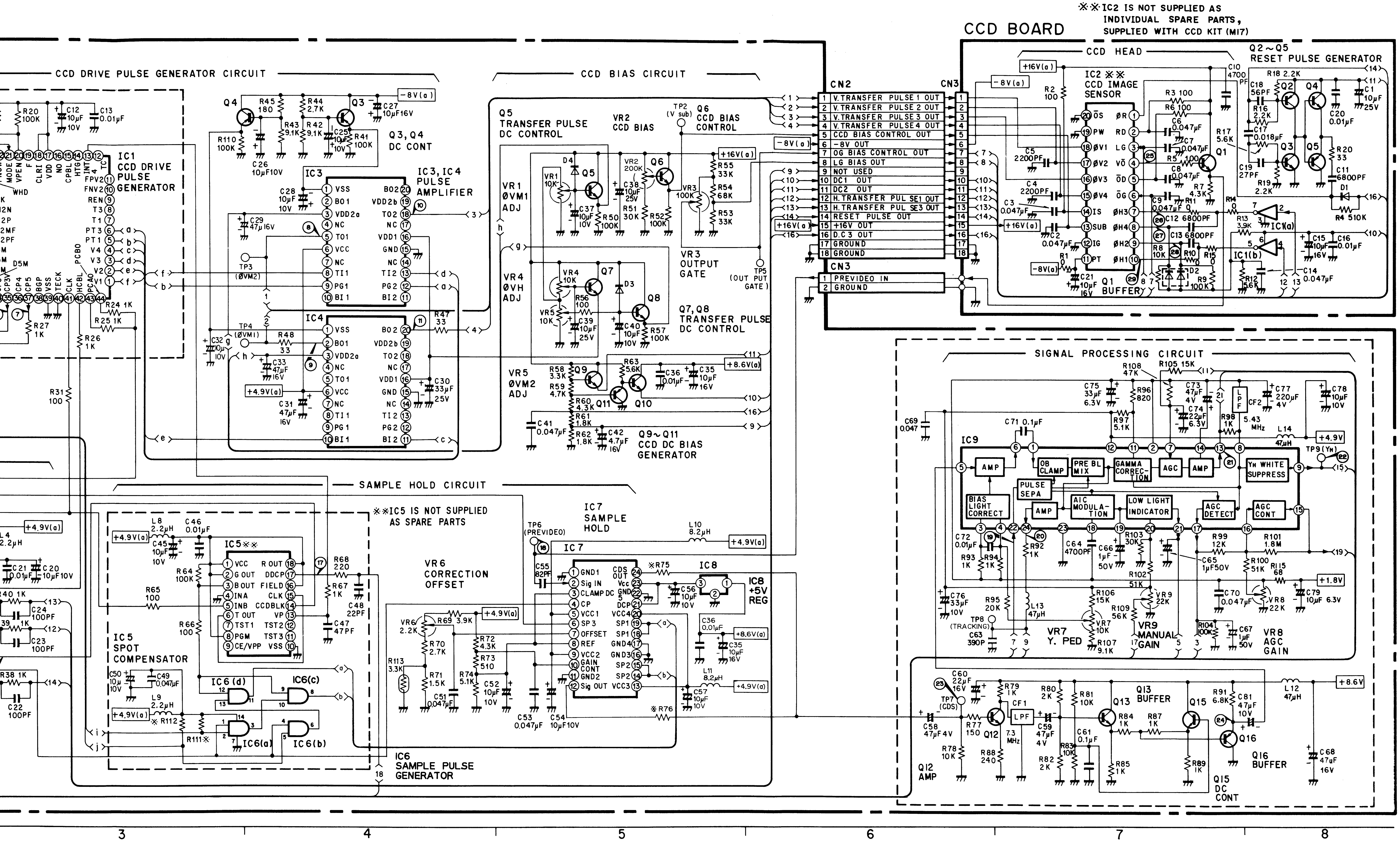
Q4	Q5
—	—
11.7	0
—	—

or n	CCD image sensor with IC5 on Head board
	1K ohms
	1K ohms
	Not Used
	0 ohm
	Not Used
	Not Used

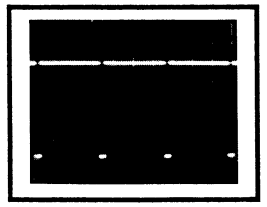
SCHEMATIC DIAGRAM OF HEAD BOARD


HEAD BOARD
TO MOTHER BOARD
CN1
CP3 OUT 36
+16V IN 35
BL IN 34
−8V IN 33
CP5 OUT 32
GROUND 31
GROUND 30
NOT USED 29
R SC OUT 28
NOT USED 27
WHD IN 26
GROUND 25
Vp IN 24
+8.6V IN 23
1/2 fH PULSE OUT 22
PREVIDEO OUT 21
SES CONTROL IN 20
AGC CONTROL OUT 19
APERTURE SIGNAL IN 18
MANUAL CONTROL OUT 17
GROUND 16
YH OUT 15
GROUND 14
NOT USED 13
GROUND 12
GAIN CONTROL IN 11
GROUND 10
AIC VIDEO OUT 9
GROUND 8
WHD/WBL IN 7
+4.9V IN 6
LOW LIGHT INF OUT 5
+8.6V IN 4
AGC DC OUT 3
+1.8V IN 2
+4.9V IN 1
CCD DRIVE PULSE GENERATOR CIRCUIT
IC1 CCD DRIVE PULSE GENERATOR
Q1 5MHz OUTPUT
Q3, Q4 DC CONT
IC3, IC4 PULSE AMPLIFIER
CCD BIAS CIRCUIT
Q5 TRANSFER PULSE DC CONTROL
VR2 CCD BIAS
Q6 CCD BIAS CONTROL
VR1 ØVM1 ADJ
VR3 OUTPUT GATE
TP5 (OUT PUT GATE)
TP2 (V sub)
VR4 ØVH ADJ
Q7, Q8 TRANSFER PULSE DC CONTROL
VR5 ØVM2 ADJ
Q9~Q11 CCD DC BIAS GENERATOR
TP3 (ØVM2)
TP4 (ØVM1)
H. TRANSFER PULSE GENERATOR
L3 fH VCO
TP1 (fH VCO)
Q2 OSC CONTROL
IC2 H TRANSFER PULSE GENERATOR
SAMPLE HOLD CIRCUIT
※IC5 IS NOT SUPPLIED AS SPARE PARTS
IC5 SPOT COMPENSATOR
IC6 SAMPLE PULSE GENERATOR
VR6 CORRECTION OFFSET
TP6 (PREVIDEO)
IC7 SAMPLE HOLD
IC8 +5V REG
C
B
A
1
2
3
4
5

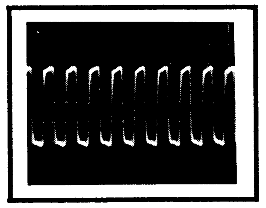
SCHEMATIC DIAGRAM OF HEAD BOARD


※※IC2 IS NOT SUPPLIED AS INDIVIDUAL SPARE PARTS, SUPPLIED WITH CCD KIT (MI7)
CCD BOARD
CCD DRIVE PULSE GENERATOR CIRCUIT
CCD BIAS CIRCUIT
CCD HEAD
Q2～Q5 RESET PULSE GENERATOR
IC1 CCD DRIVE PULSE GENERATOR
Q3, Q4 DC CONT
IC3, IC4 PULSE AMPLIFIER
Q5 TRANSFER PULSE DC CONTROL
VR2 CCD BIAS
Q6 CCD BIAS CONTROL
VR1 ØVM1 ADJ
VR3 OUTPUT GATE
VR4 ØVH ADJ
Q7, Q8 TRANSFER PULSE DC CONTROL
VR5 ØVM2 ADJ
Q9～Q11 CCD DC BIAS GENERATOR
IC2 ※※ CCD IMAGE SENSOR
Q1 BUFFER
CN2
CN3
1 V.TRANSFER PULSE 1 OUT
2 V.TRANSFER PULSE 2 OUT
3 V.TRANSFER PULSE 3 OUT
4 V.TRANSFER PULSE 4 OUT
5 CCD BIAS CONTROL OUT
6 -8V OUT
7 OG BIAS CONTROL OUT
8 LG BIAS OUT
9 NOT USED
10 DC1 OUT
11 DC2 OUT
12 H.TRANSFER PULSE1 OUT
13 H.TRANSFER PULSE3 OUT
14 RESET PULSE OUT
15 +16V OUT
16 D.C3 OUT
17 GROUND
18 GROUND
CN3
1 PREVIDEO IN
2 GROUND
TP2 (V sub)
TP3 (ØVM2)
TP4 (ØVM1)
TP5 (OUT PUT GATE)
SAMPLE HOLD CIRCUIT
※※IC5 IS NOT SUPPLIED AS SPARE PARTS
IC5 SPOT COMPENSATOR
VR6 CORRECTION OFFSET
IC7 SAMPLE HOLD
IC8 +5V REG
IC6 SAMPLE PULSE GENERATOR
TP6 (PREVIDEO)
SIGNAL PROCESSING CIRCUIT
IC9
AMP
OB CLAMP
PRE BL MIX
GAMMA CORRECTION
AGC
AMP
YH WHITE SUPPRESS
PULSE SEPA
BIAS LIGHT CORRECT
AMP
AIC MODULATION
LOW LIGHT INDICATOR
AGC DETECT
AGC CONT
TP9 (YH)
TP8 (TRACKING)
TP7 (CDS)
VR7 Y. PED
VR9 MANUAL GAIN
VR8 AGC GAIN
Q12 AMP
Q13 BUFFER
Q15 DC CONT
Q16 BUFFER
LPF
CF1 7.3 MHz
CF2 5.43 MHz
+16V(a)
-8V(a)
+4.9V(a)
+8.6V(a)
+4.9V
+8.6V
+1.8V
3
4
5
6
7
8

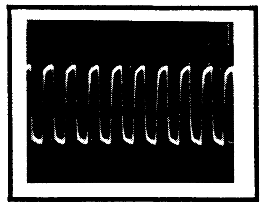
1. 1V/DIV, 20µs/DIV



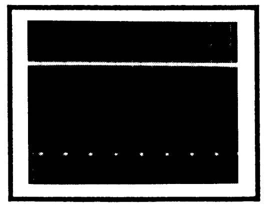
2. 1V/DIV, 20µs/DIV



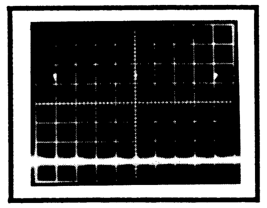
3. 1V/DIV, 20µs/DIV



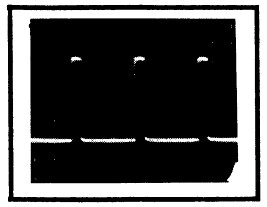
4. 1V/DIV, 5ms/DIV



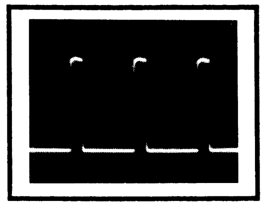
5. 1V/DIV, 5ms/DIV



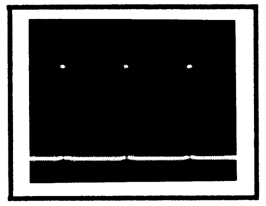
6. 1V/DIV, 20µs/DIV



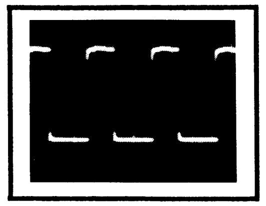
7. 1V/DIV, 20µs/DIV



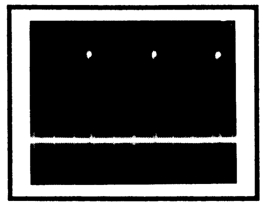
8. 1V/DIV, 20µs/DIV



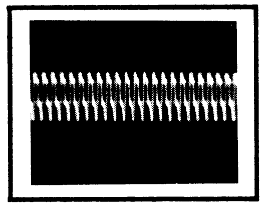
9. 1V/DIV, 20µs/DIV



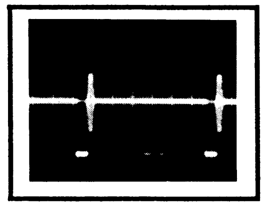
10. 1V/DIV, 20µs/DIV



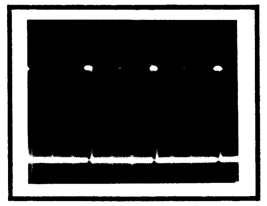
11. 20mV/DIV, 0.5µs/DIV



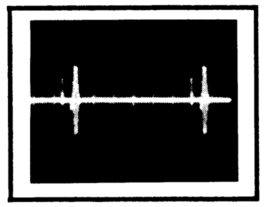
12. 0.1V/DIV, 10µs/DIV



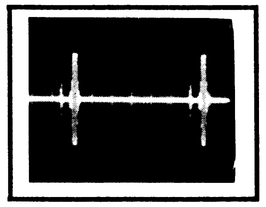
13. 1V/DIV, 20µs/DIV



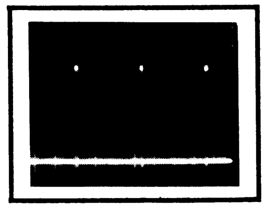
14. 0.2V/DIV, 10µs/DIV



15. 0.2V/DIV, 10µs/DIV



16. 1V/DIv, 20µs/DIV



Note : Voltage shows with ( ) are measured by Gen-lock mode.

	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8
Pin 1	2.5	(0) 0	(0) 0	(4.6) 4.6	(4.6) 4.6	(4.6) 4.7	4.7	(0) 0
2	1.8	(1.7) 1.7	(0) 0	(0.3) 0	(4.6) 4.6	(0) 0	4.7	(4.4) 4.7
3	1.8	(0.1) 0	(2.1) 0.5	(4.2) 4.6	(0.7) 0.7	(3.6) 0	0	(4.6) 4.7
4	2.5	(4.3) 4.6	(2.1) 1.8	(0)0	(0) 0	(0) 2.4	0	(0) 4.7
5	0.9	(0) 0	(1.8) 1.8	(0) 0	(0.1) 0	(4.6) 2.3	4.6	(0.2) 0
6	7.1	(0) 0	(0) 0	(4.7) 4.7	(0.2) 0	(2.2) 2.2	4.6	(4.4) 4.7
7	0	(4.5) 0	(0) 0	(0) 0	(0) 0	(2.2) 2.1	0	(0) 0
8	3.9	(0) 0	(0) 0	(0.3) 0	(4.6) 4.6	(0) 0	4.6	(4.7) 4.7
9	0	(0) 0	(4.7) 0	(4.3) 4.7	(4.2) 4.7	(0) 0	4.6	(0) 0
10	3.9	(0) 0	(4.7) 0	(4.3) 4.7	(4.6) 4.6	(4.6) 0	0	(4.7) 0
11	0	(0.6) 0	(4.7) 0	(4.3) 4.7	(0.5) 0.5	(2.3) 0	0	(0) 4.7
12	7.1	(4.4) 4.7	(0) 0	(0.1) 0	(2.4) 0	(2.3) 2.3	4.6	(0) 0
13	0	(0.2) 0	(0) 0	(0) 0	(2.2) 1.7	(4.6) 4.7	4.6	(4.7) 4.7
14	0	(0) 0	(0) 0	(4.7) 4.7	(2.3) 4.3	(2.3) 0	4.6	(4.7) 4.7
15		(4.6) 4.6	(0) 0		(2.3) 0	(3.9) 2.3		
16		(4.7) 4.7	(4.7) 4.7		(4.6) 4.7	(2.6) 2.3		
17					(2.3) 2.3	(4.6) 0.8		
18					(2.3) 0	(3.9) 3.9		
19					(4.6) 0	(0.2) 0.2		
20					(0.6) 0	(3.0) 3.0		
21					(4.6) 4.6	(0.2) 0.2		
22					(0) 0	(0) 0		
23					(4.6) 4.7	(1.2) 1.2		
24					(2.2) 2.3	(0.7) 0.7		
25					(1.7) 0	(0) 0		
26					(2.4) 0	(4.2) 4.2		
27					(2.4) 4.7	(0) 0		
28					(3.6) 0	(4.7) 4.7		

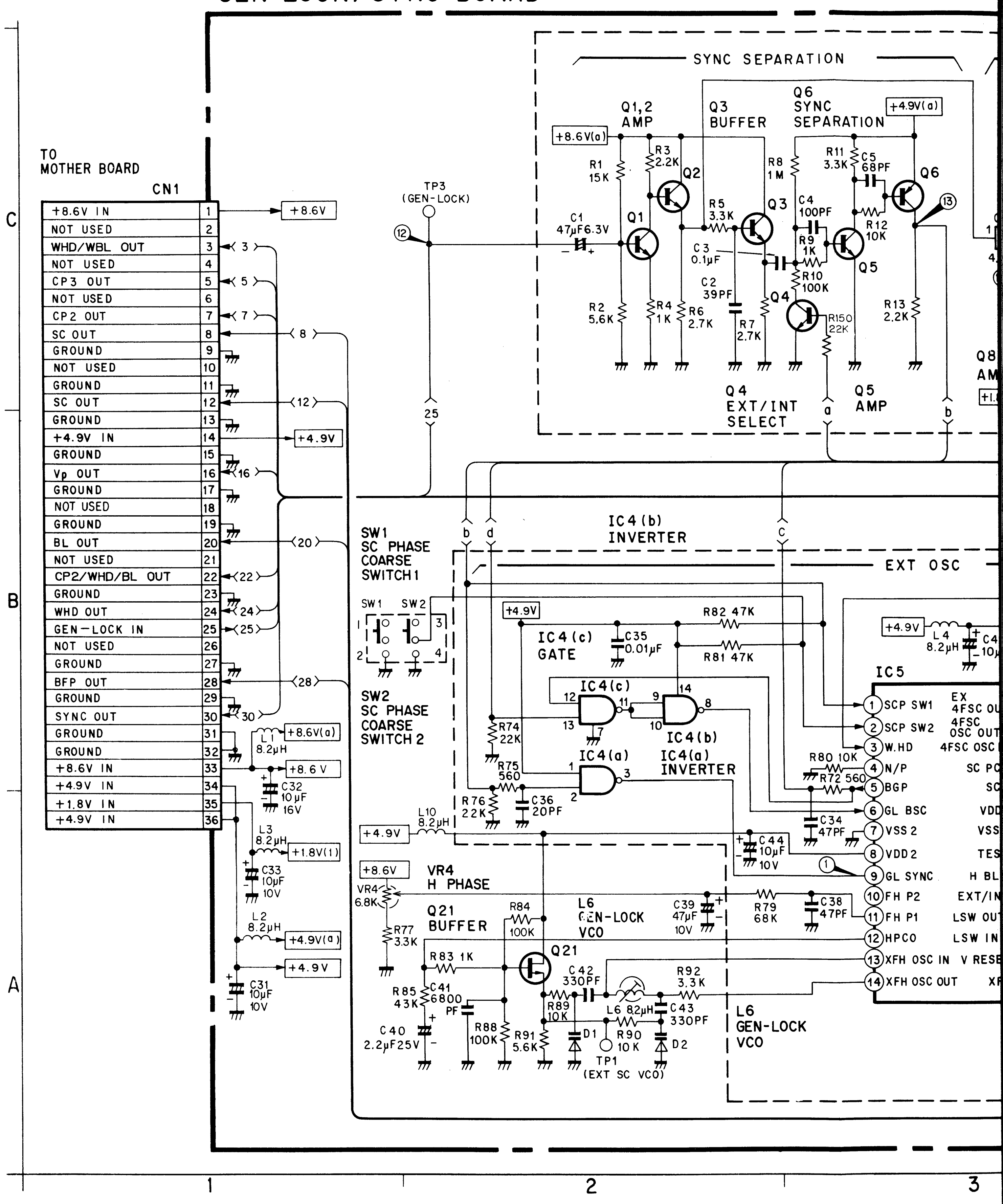
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17
B	2.2	4.7	4.1	0.6	0.4	4.6	1.7	0	0	4.7	1.6	1.0	1.7	1.6	1.7	1.7	2.9
C	4.7	8.2	8.2	0	4.6	0	3.6	0	4.6	4.7	3.7	0	2.9	3.7	4.7	2.9	4.7
E	1.5	4.1	3.5	0	0	4.7	0	1.0	0	3.9	1.0	1.6	1.0	1.0	1.0	1.0	2.2

	Q18	Q19	Q20	Q21	Q22	Q24	Q25
B	(0.6) 0	(0) 0.3	(1.2) 1.2	(2.5) G 0	(1.7) G 0	2.2	(0) G 0.9
C	(0) 4.5	(0) 0	(0) 0	(4.7) D 4.7	(4.7) D 4.7	4.7	(4.7) D 4.7
E	(0) 0	(0.9) 1.0	(1.9) 1.9	(2.9) S 0.6	(2.1) S 0.5	1.5	(0.6) S 1.4

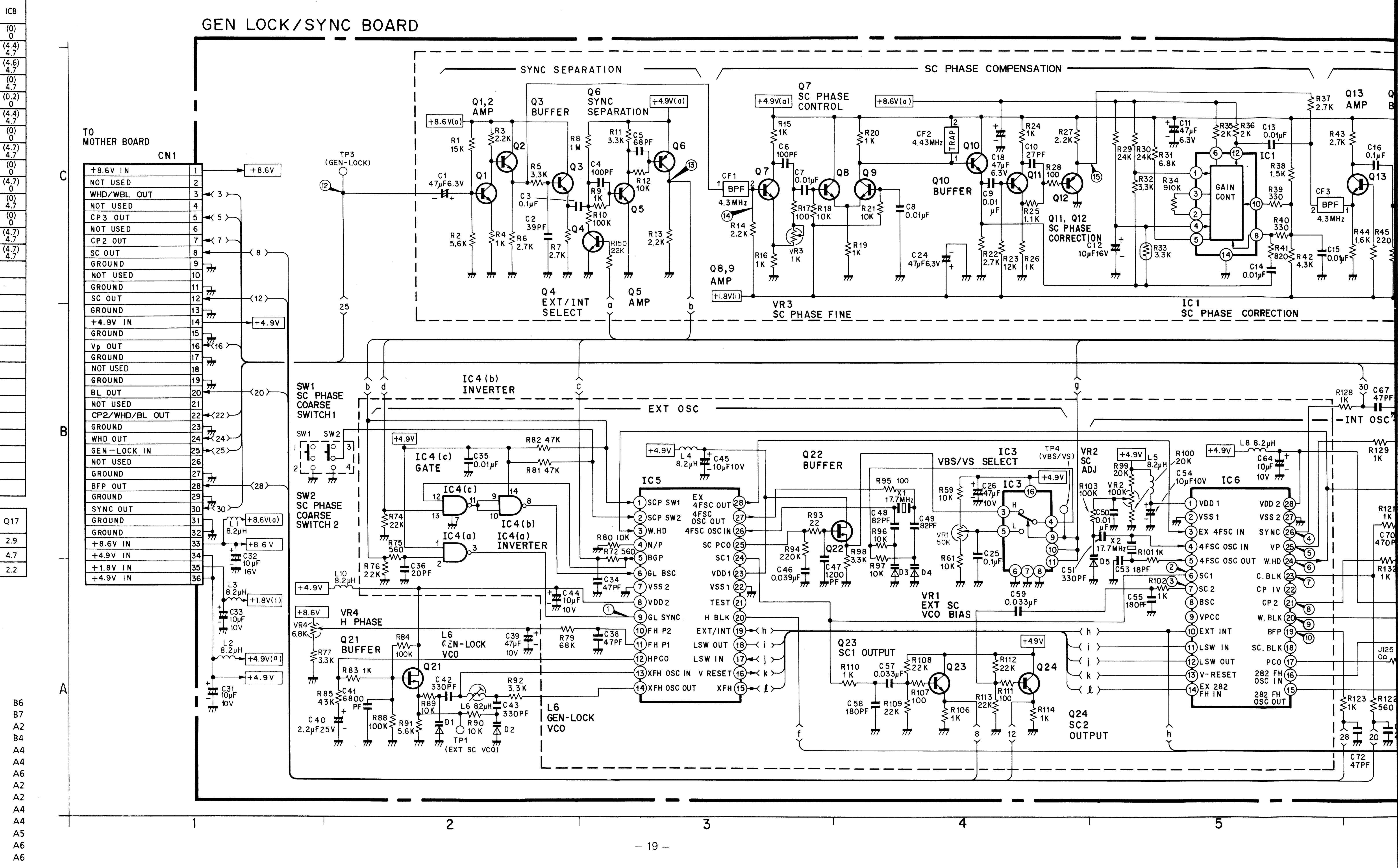
Gen-Lock/Sync Board

IC1	NJM1496M		C5
IC2	MN74HC221S		C7
IC3	MN4053BS		B4
IC4	MN74HC00S		B2
IC5	MN6761S		A3
IC6	MN67602PS		A5
IC7	MN74HC00S		A7
IC8	MN74HC74S		A7
Q1	2SC2404-CDTW	(U)	C2
Q2	2SD601-QR	(Y)	C2
Q3	2SD601-QR	(Y)	C2
Q4	2SD601-QR	(Y)	C3
Q5	2SC2404-CDTW	(U)	C3
Q6	2SB709-Q	(A)	C3
Q7	2SC2404-CDTW	(U)	C3
Q8	2SC2404-CDTW	(U)	C3
Q9	2SC2404-CDTW	(U)	C4
Q10	2SC2404-CDTW	(U)	C4
Q11	2SC2404-CDTW	(U)	C4
Q12	2SA1022-C	(E)	C4
Q13	2SC2404-CDTW	(U)	C6
Q14	2SC2404-CDTW	(U)	C6
Q15	2SC2404-CDTW	(U)	C6
Q16	2SC2404-CDTW	(U)	C6
Q17	2SC2404-CDTW	(U)	C6
Q18	2SD601-QR	(Y)	B7
Q19	2SB709-Q	(A)	B6
Q20	2SB709-Q	(A)	B7
Q21	2SK198-Q	(1Q)	A2
Q22	2SK198-Q	(1Q)	B4
Q23	2SC2404-CDTW	(U)	A4
Q24	2SC2404-CDTW	(U)	A4
Q25	2SK198-PQRTX	(1Q)	A6
D1	1SV153		A2
D2	1SV153		A2
D3	1SV153		A4
D4	1SV153		A4
D5	1SV153		A5
D6	1SV153		A6
D7	1SV153		A6

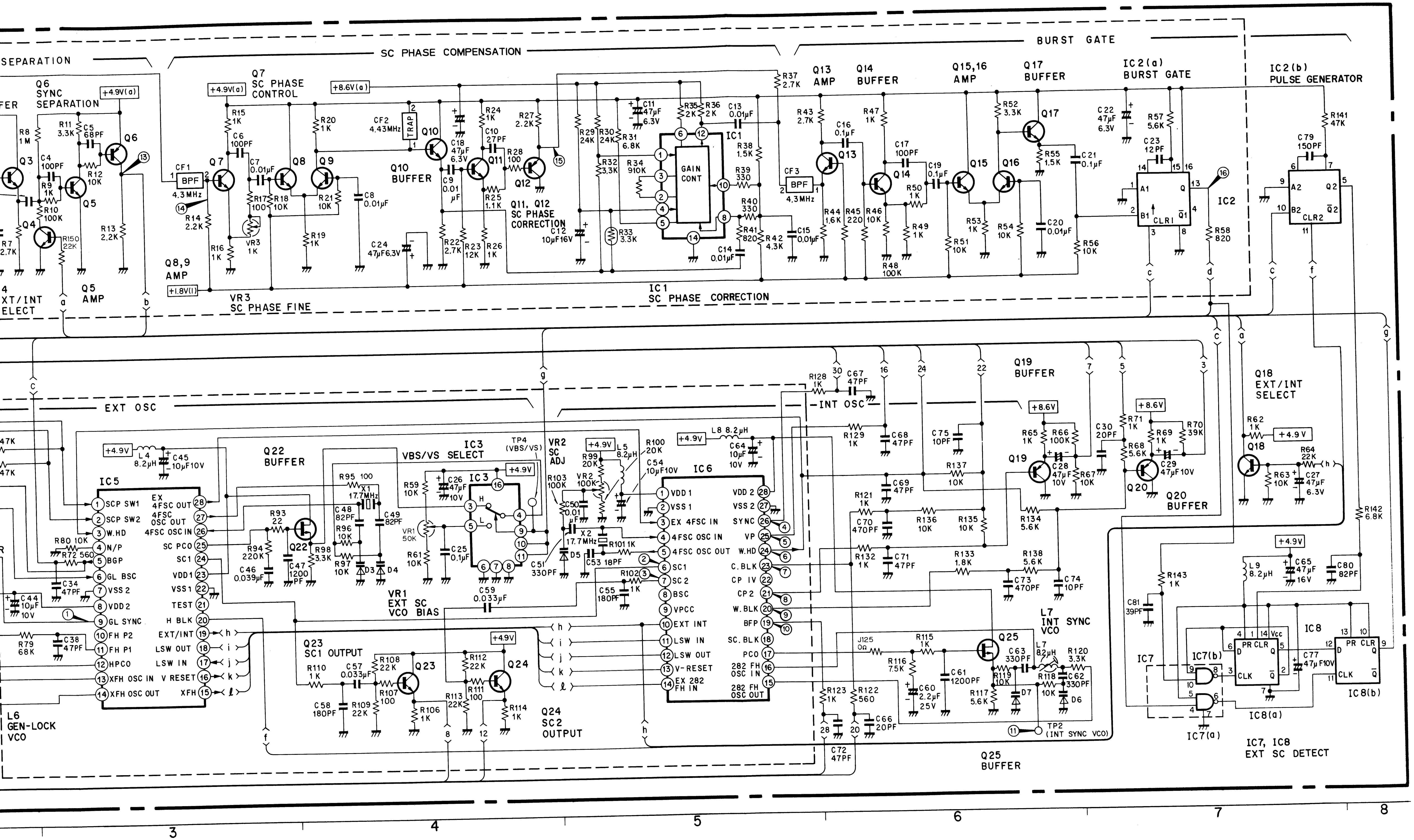
GEN LOCK/SYNC BOARD


TO MOTHER BOARD
CN1
+8.6V IN
NOT USED
WHD/WBL OUT
CP3 OUT
CP2 OUT
SC OUT
GROUND
+4.9V IN
Vp OUT
BL OUT
CP2/WHD/BL OUT
WHD OUT
GEN-LOCK IN
BFP OUT
SYNC OUT
+1.8V IN
+8.6V
+4.9V
+8.6V(a)
+1.8V(1)
+4.9V(a)
SYNC SEPARATION
Q1,2 AMP
Q3 BUFFER
Q6 SYNC SEPARATION
Q4 EXT/INT SELECT
Q5 AMP
TP3 (GEN-LOCK)
IC4(b) INVERTER
IC4(c) GATE
IC4(a) INVERTER
SW1 SC PHASE COARSE SWITCH1
SW2 SC PHASE COARSE SWITCH 2
EXT OSC
IC5
SCP SW1
SCP SW2
W.HD
N/P
BGP
GL BSC
VSS 2
VDD 2
GL SYNC
FH P2
FH P1
HPCO
XFH OSC IN
XFH OSC OUT
VR4 H PHASE
Q21 BUFFER
L6 GEN-LOCK VCO
TP1 (EXT SC VCO)
C
B
A
1
2
3

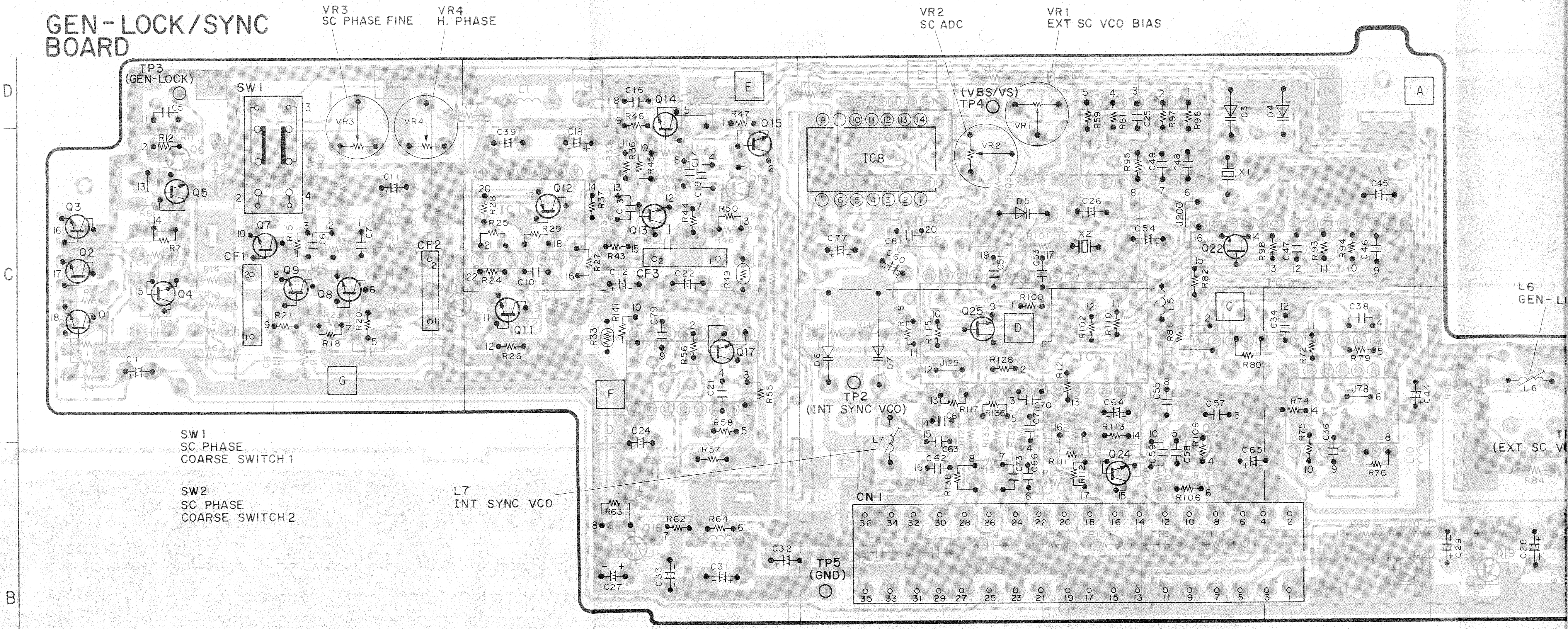
SCHEMATIC DIAGRAM OF GEN-LOCK BOARD


GEN LOCK/SYNC BOARD
TO MOTHER BOARD
CN1
1 +8.6V IN
2 NOT USED
3 WHD/WBL OUT
4 NOT USED
5 CP3 OUT
6 NOT USED
7 CP2 OUT
8 SC OUT
9 GROUND
10 NOT USED
11 GROUND
12 SC OUT
13 GROUND
14 +4.9V IN
15 GROUND
16 Vp OUT
17 GROUND
18 NOT USED
19 GROUND
20 BL OUT
21 NOT USED
22 CP2/WHD/BL OUT
23 GROUND
24 WHD OUT
25 GEN-LOCK IN
26 NOT USED
27 GROUND
28 BFP OUT
29 GROUND
30 SYNC OUT
31 GROUND
32 GROUND
33 +8.6V IN
34 +4.9V IN
35 +1.8V IN
36 +4.9V IN
TP3 (GEN-LOCK)
SYNC SEPARATION
Q1,2 AMP
Q3 BUFFER
Q6 SYNC SEPARATION
Q4 EXT/INT SELECT
Q5 AMP
SC PHASE COMPENSATION
Q7 SC PHASE CONTROL
Q8,9 AMP
VR3 SC PHASE FINE
Q10 BUFFER
Q11, Q12 SC PHASE CORRECTION
IC1 SC PHASE CORRECTION
GAIN CONT
Q13 AMP
CF1 BPF 4.3MHz
CF2 4.43MHz TRAP
CF3 BPF 4.3MHz
SW1 SC PHASE COARSE SWITCH 1
SW2 SC PHASE COARSE SWITCH 2
IC4(b) INVERTER
IC4(c) GATE
IC4(a) INVERTER
EXT OSC
INT OSC
IC5
SCP SW1
SCP SW2
W.HD
N/P
BGP
GL BSC
VSS 2
VDD 2
GL SYNC
FH P2
FH P1
HPCO
XFH OSC IN
XFH OSC OUT
EX 4FSC OUT
4FSC OSC OUT
4FSC OSC IN
SC PCO
SC1
VDD1
VSS1
TEST
H BLK
EXT/INT
LSW OUT
LSW IN
V RESET
XFH
Q22 BUFFER
X1 17.7MHz
VR1 EXT SC VCO BIAS
IC3 VBS/VS SELECT
TP4 (VBS/VS)
VR2 SC ADJ
X2 17.7MHz
IC6
VDD 1
VSS 1
EX 4FSC IN
4FSC OSC IN
4FSC OSC OUT
SC1
SC 2
BSC
VPCC
EXT INT
LSW IN
LSW OUT
V-RESET
EX 282 FH IN
VDD 2
VSS 2
SYNC
VP
W.HD
C.BLK
CP IV
CP 2
W.BLK
BFP
SC.BLK
PCO
282 FH OSC IN
282 FH OSC OUT
VR4 H PHASE
Q21 BUFFER
L6 GEN-LOCK VCO
TP1 (EXT SC VCO)
Q23 SC1 OUTPUT
Q24 SC2 OUTPUT
+8.6V
+8.6V(a)
+4.9V
+4.9V(a)
+1.8V(l)
IC8
Q17
B6 B7 A2 B4 A4 A4 A6 A2 A2 A4 A4 A5 A6 A6
A B C
1 2 3 4 5

SCHEMATIC DIAGRAM OF GEN-LOCK BOARD


SEPARATION
SC PHASE COMPENSATION
BURST GATE
Q6 SYNC SEPARATION
Q7 SC PHASE CONTROL
Q10 BUFFER
Q11, Q12 SC PHASE CORRECTION
Q8,9 AMP
VR3 SC PHASE FINE
IC1 SC PHASE CORRECTION
GAIN CONT
Q13 AMP
Q14 BUFFER
Q15,16 AMP
Q17 BUFFER
IC2(a) BURST GATE
IC2(b) PULSE GENERATOR
Q5 AMP
EXT/INT SELECT
+4.9V(a)
+8.6V(a)
+1.8V(I)
CF1 BPF 4.3MHz
CF2 4.43MHz TRAP
CF3 BPF 4.3MHz
R8 1M
R11 3.3K
C5 68PF
C4 100PF
R9 1K
R10 100K
R12 10K
R13 2.2K
R150 22K
R7 2.7K
R14 2.2K
R15 1K
C6 100PF
R16 1K
C7 0.01µF
R17 100
R18 10K
VR3 1K
R20 1K
R19 1K
R21 10K
C8 0.01µF
C24 47µF6.3V
C18 47µF 6.3V
C9 0.01 µF
R22 2.7K
R23 12K
R24 1K
C10 27PF
R25 1.1K
R26 1K
R27 2.2K
R28 100
C11 47µF 6.3V
C12 10µF16V
R29 24K
R30 24K
R31 6.8K
R32 3.3K
R33 3.3K
R34 910K
R35 2K
R36 2K
R37 2.7K
R38 1.5K
R39 330
R40 330
R41 820
R42 4.3K
C13 0.01µF
C14 0.01µF
C15 0.01µF
R43 2.7K
R44 1.6K
R45 220
R46 10K
R47 1K
R48 100K
R49 1K
R50 1K
C16 0.1µF
C17 100PF
C19 0.1µF
R51 10K
R52 3.3K
R53 1K
R54 10K
R55 1.5K
R56 10K
C20 0.01µF
C21 0.1µF
C22 47µF 6.3V
C23 12PF
R57 5.6K
R58 820
C79 150PF
R141 47K
A1 A2 B1 B2 Q Q̄1 Q2 Q̄2 CLR1 CLR2
EXT OSC
INT OSC
IC5
SCP SW1
SCP SW2
W.HD
N/P
BGP
GL BSC
VSS 2
VDD 2
GL SYNC
FH P2
FH P1
HPCO
XFH OSC IN
XFH OSC OUT
EX 4FSC OUT
4FSC OSC OUT
4FSC OSC IN
SC PCO
SC1
VDD1
VSS1
TEST
H BLK
EXT/INT
LSW OUT
LSW IN
V RESET
XFH
L4 8.2µH
C45 10µF10V
R80 10K
R72 560
C34 47PF
C44 10µF 10V
R79 68K
C38 47PF
L6 GEN-LOCK VCO
Q22 BUFFER
R93 22
R94 220K
C46 0.039µF
C47 1200 PF
R98 3.3K
IC3 VBS/VS SELECT
TP4 (VBS/VS)
R95 100
X1 17.7MHz
C48 82PF
C49 82PF
R96 10K
R97 10K
D3 D4
R59 10K
C26 47µF 10V
VR1 50K
R61 10K
C25 0.1µF
VR1 EXT SC VCO BIAS
C59 0.033µF
Q23 SC1 OUTPUT
R110 1K
C57 0.033µF
R108 22K
R107 100
C58 180PF
R109 22K
R106 1K
R112 22K
R111 100
R113 22K
R114 1K
Q24 SC2 OUTPUT
VR2 SC ADJ
R103 100K
VR2 100K
R99 20K
L5 8.2µH
R100 20K
C54 10µF10V
C50 0.01µF
X2 17.7MHz
D5
R101 1K
C51 330PF
C53 18PF
R102 3K
C55 180PF
IC6
VDD 1
VSS 1
EX 4FSC IN
4FSC OSC IN
4FSC OSC OUT
SC1
SC 2
BSC
VPCC
EXT INT
LSW IN
LSW OUT
V-RESET
EX 282 FH IN
VDD 2
VSS 2
SYNC
VP
W.HD
C.BLK
CP IV
CP 2
W.BLK
BFP
SC. BLK
PCO
282 FH OSC IN
282 FH OSC OUT
L8 8.2µH
C64 10µF 10V
R128 1K
C67 47PF
R129 1K
C68 47PF
C75 10PF
C69 47PF
R137 10K
R121 1K
C70 470PF
R136 10K
R135 10K
R132 1K
C71 47PF
R133 1.8K
R123 1K
R122 560
C66 20PF
C72 47PF
J125 0Ω
R115 1K
R116 7.5K
C60 2.2µF 25V
C61 1200PF
Q25 BUFFER
C63 330PF
L7 82µH
L7 INT SYNC VCO
R119 10K
D7
R117 5.6K
R118 10K
R120 3.3K
C62 330PF
D6
TP2 (INT SYNC VCO)
Q19 BUFFER
+8.6V
R65 1K
R66 100K
C28 47µF 10V
R67 10K
C30 20PF
R134 5.6K
R138 5.6K
C73 470PF
C74 10PF
R71 1K
R68 5.6K
R69 1K
R70 39K
C29 47µF10V
Q20 BUFFER
Q18 EXT/INT SELECT
R62 1K
+4.9V
R63 10K
R64 22K
C27 47µF 6.3V
R142 6.8K
R143 1K
C81 39PF
L9 8.2µH
C65 47µF 16V
C80 82PF
C77 47µF10V
IC7(a) IC7(b)
IC8(a) IC8(b)
PR CLR Vcc D Q CLK Q̄
IC7, IC8 EXT SC DETECT
a b c d f g h i j k ℓ
3 4 5 6 7 8

CONDUCTOR VIEW OF GEN-LOCK BOARD


GEN-LOCK/SYNC BOARD
VR3 SC PHASE FINE
VR4 H. PHASE
VR2 SC ADC
VR1 EXT SC VCO BIAS
TP3 (GEN-LOCK)
TP4 (VBS/VS)
TP2 (INT SYNC VCO)
TP5 (GND)
SW1
CF1
CF2
CF3
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
CN1
L6 GEN-L
(EXT SC V
SW1 SC PHASE COARSE SWITCH 1
SW2 SC PHASE COARSE SWITCH 2
L7 INT SYNC VCO
D
C
B

▬ ─W─● COMPONENT SIDE
▬ ─W─● PATTERN SIDE

TO MOTHER BOARD

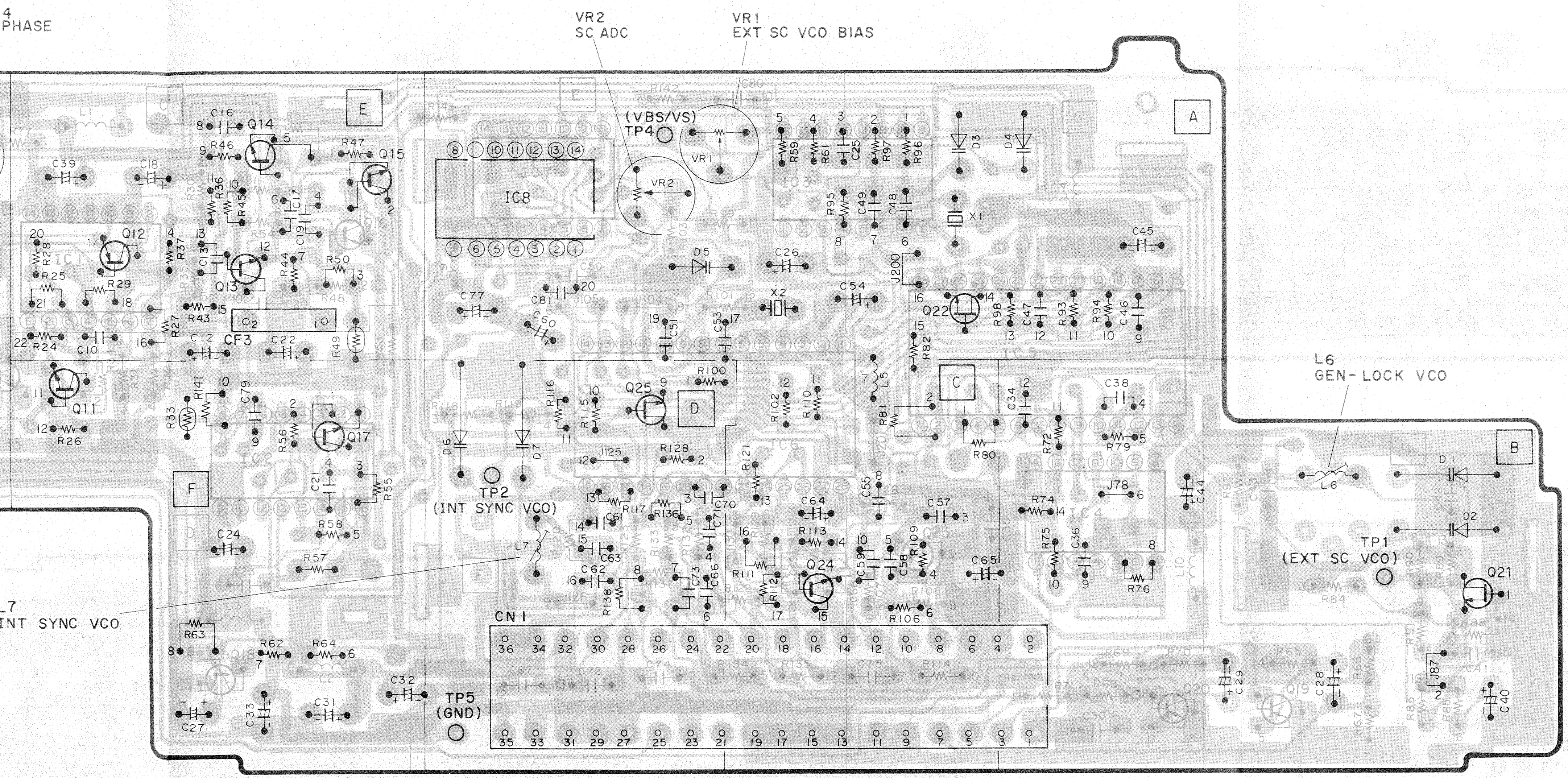
CN1

1	+8.6V IN	19	GROUND
2	NOT USED	20	BL OUT
3	WHD/WBL OUT	21	NOT USED
4	NOT USED	22	CP2/WHD/BL OUT
5	CP3 OUT	23	GROUND
6	NOT USED	24	WHD OUT
7	CP2 OUT	25	GEN-LOCK IN
8	SC OUT	26	NOT USED
9	GROUND	27	GROUND
10	NOT USED	28	BFP OUT
11	GROUND	29	GROUND
12	SC OUT	30	SYNC OUT
13	GROUND	31	GROUND
14	+4.9V IN	32	GROUND
15	GROUND	33	+8.6V IN
16	Vp OUT	34	+4.9V IN
17	GROUND	35	+1.8V IN
18	NOT USED	36	+4.9V IN

A

1 2 3 4 5

CONDUCTOR VIEW OF GEN-LOCK BOARD


4
PHASE
VR2
SC ADC
VR1
EXT SC VCO BIAS
(VBS/VS)
TP4
IC8
IC7
IC3
IC1
IC2
IC5
IC6
IC4
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
Q25
CF3
X1
X2
TP2
(INT SYNC VCO)
L6
GEN-LOCK VCO
TP1
(EXT SC VCO)
L7
INT SYNC VCO
CN1
TP5
(GND)
A
B
C
D
E
F

CN1

TO
MOTHER
BOARD

1	+8.6V IN	19	GROUND
2	NOT USED	20	BL OUT
3	WHD/WBL OUT	21	NOT USED
4	NOT USED	22	CP2/WHD/BL OUT
5	CP3 OUT	23	GROUND
6	NOT USED	24	WHD OUT
7	CP2 OUT	25	GEN-LOCK IN
8	SC OUT	26	NOT USED
9	GROUND	27	GROUND
10	NOT USED	28	BFP OUT
11	GROUND	29	GROUND
12	SC OUT	30	SYNC OUT
13	GROUND	31	GROUND
14	+4.9V IN	32	GROUND
15	GROUND	33	+8.6V IN
16	Vp OUT	34	+4.9V IN
17	GROUND	35	+1.8V IN
18	NOT USED	36	+4.9V IN

▨ —W— COMPONENT SIDE
▨ —W— PATTERN SIDE

2 3 4 5 6

Gen-Lock/Sync Board

IC1	NJM1496M		C2
IC2	MN74HC221S		C3
IC3	MN4053BS		C4
IC4	MN74HC00S		C5
IC5	MN6761S		C5
IC6	MN67602PS		C4
IC7	MN74HC00S		C3
IC8	MN74HC74S		C3
Q1	2SC2404-CDTW	(U)	C1
Q2	2SD601-QR	(Y)	C1
Q3	2SD601-QR	(Y)	C1
Q2	2SD601-QR	(Y)	C1
Q5	2SC2404-CDTW	(U)	C1
Q6	2SB709-Q	(A)	C1
Q7	2SC2404-CDTW	(U)	C1
Q8	2SC2404-CDTW	(U)	C2
Q9	2SC2404-CDTW	(U)	C1
Q10	2SC2404-CDTW	(U)	C2
Q11	2SC2404-CDTW	(U)	C2
Q12	2SA1022-C	(E)	C3
Q13	2SC2404-CDTW	(U)	C2
Q14	2SC2404-CDTW	(U)	C3
Q15	2SC2404-CDTW	(U)	C3
Q16	2SC2404-CDTW	(U)	C3
Q17	2SC2404-CDTW	(U)	C3
Q18	2SD601-QR	(Y)	B2
Q19	2SB709-Q	(A)	B5
Q20	2SB709-Q	(A)	B5
Q21	2SK198-Q	(1Q)	B6
Q22	2SK198-Q	(1Q)	C4
Q23	2SC2404-CDTW	(U)	B4
Q24	2SC2404-CDTW	(U)	B4
Q25	2SK198-PQRTX	(1Q)	C4
D1	1SV153		B6
D2	1SV153		B6
D3	1SV153		C4
D4	1SV153		C5
D5	1SV153		C4
D6	1SV153		C3
D7	1SV153		C3

CONDUCTOR VIEW OF PROCESS BOARD

Process Board

IC1	MN3106S		A4
IC2	HB12		B7
IC3	HB18		B7
IC4	NJU4053BM		B5
IC5	AN2361S		B5
IC6	HB16		B4
IC7	AN2210SA		A3
Q1	2SD601-QR	(Y)	B6
Q2	2SD601-QR	(Y)	B6
Q3	2SD601-QR	(Y)	A6
Q4	2SC2404-CDTW	(U)	A6
Q5	2SC2404-CDTW	(U)	A6
Q6	2SD601-QR	(Y)	A5
Q7	2SB709-Q	(A)	A5
Q8	2SD601-QR	(Y)	A7
Q9	2SD601-QR	(Y)	B6
Q10	2SA1022-BCTX	(E)	B4
Q11	2SA1022-BCTX	(E)	B5
Q12	2SC2404-CDTX	(U)	B5
Q13	2SD601-QR	(Y)	B5
Q14	2SD601-QR	(Y)	A5
Q15	2SB709-Q	(A)	A3
Q16	2SK198-Q	(1Q)	B3
D1	MA151KTX	(MH)	A3

Process VIC-1 Board

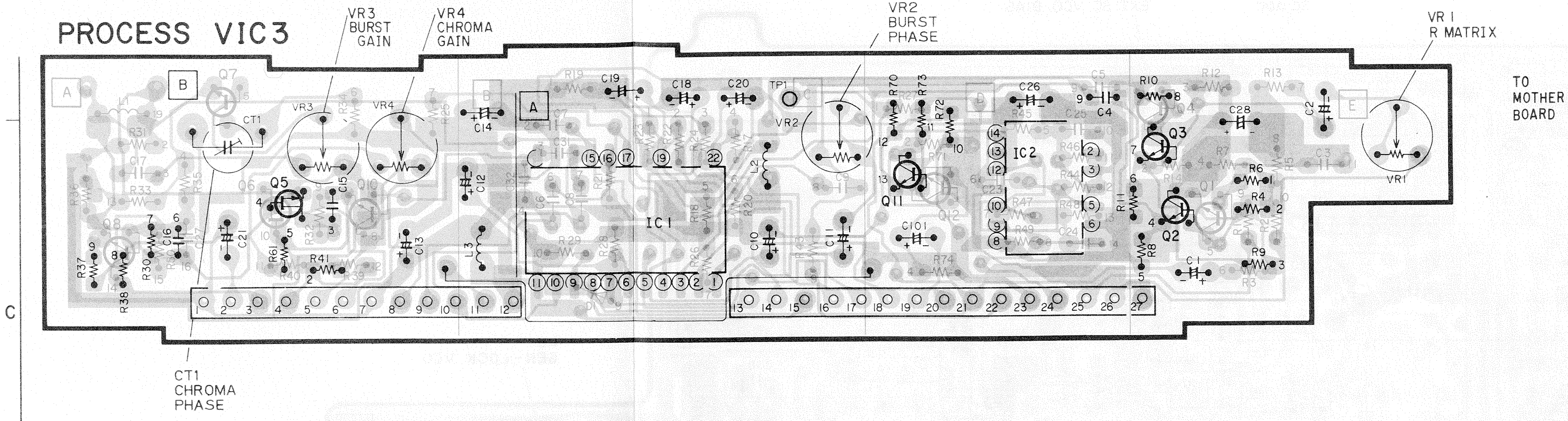
IC1	MN3802A		A1
Q1	2SB709-Q	(A)	A1
Q2	2SD601-QR	(W)	A1
Q3	2SC2404-CDTW	(U)	A2
Q4	2SC2404-CDTW	(U)	A2
Q5	2SD601-QR	(W)	A2

Process VIC-2 Board

IC1	AN608		B2
IC2	AN2020S		B1
Q1	2SC2404-CDTW	(U)	B2
Q2	2SD601-QR	(Y)	B2
D1	1SS108		B2
D2	1SS108		B2

Process VIC-3 Board

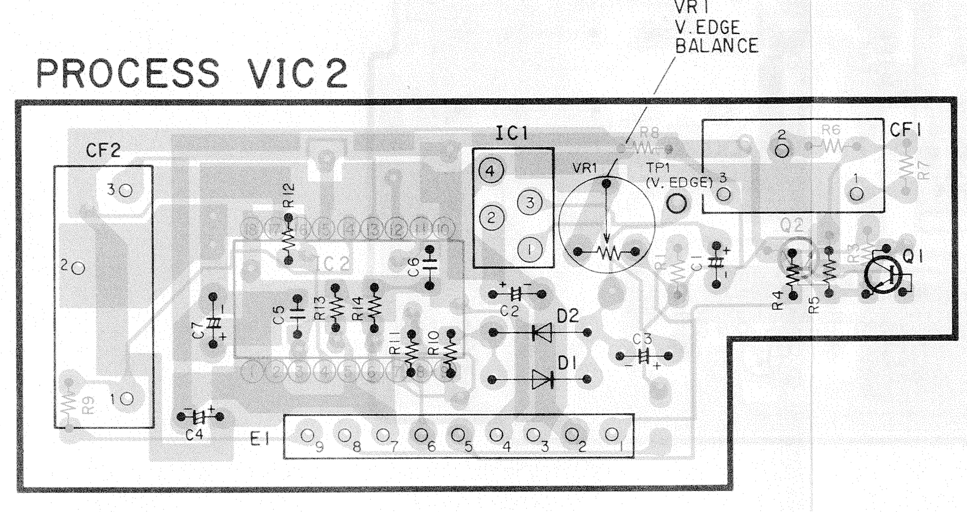
IC1	AN2410S		C2
IC2	NJM319M		C3
Q1	2SD601-QR	(Y)	C4
Q2	2SD601-QR	(Y)	C4
Q3	2SD601-QR	(Y)	C3
Q4	2SD601-QR	(Y)	C3
Q5	2SK198-Q	(1Q)	C1
Q6	2SK198-Q	(1Q)	C1
Q7	2SC2404-CDTW	(U)	C1
Q8	2SC2404-CDTW	(U)	C1
Q10	2SC2404-CDTW	(U)	C1
Q11	2SC2404-CDTW	(U)	C3
Q12	2SD601-QR	(Y)	C3
D1	MA151KTX	(MH)	C2

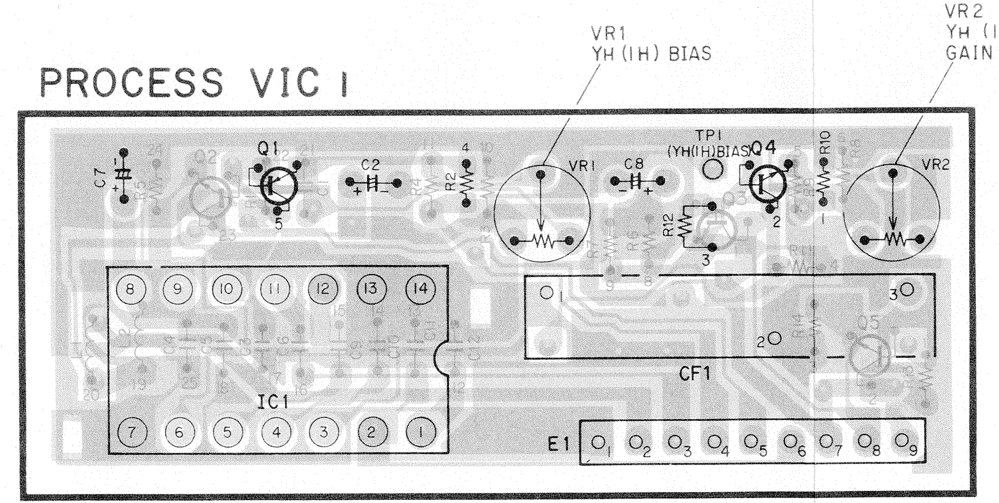

PROCESS VIC3
VR3 BURST GAIN
VR4 CHROMA GAIN
VR2 BURST PHASE
VR I R MATRIX
CT1 CHROMA PHASE
IC1
IC2
Q1
Q2
Q3
Q5
Q7
Q11
TP1
C

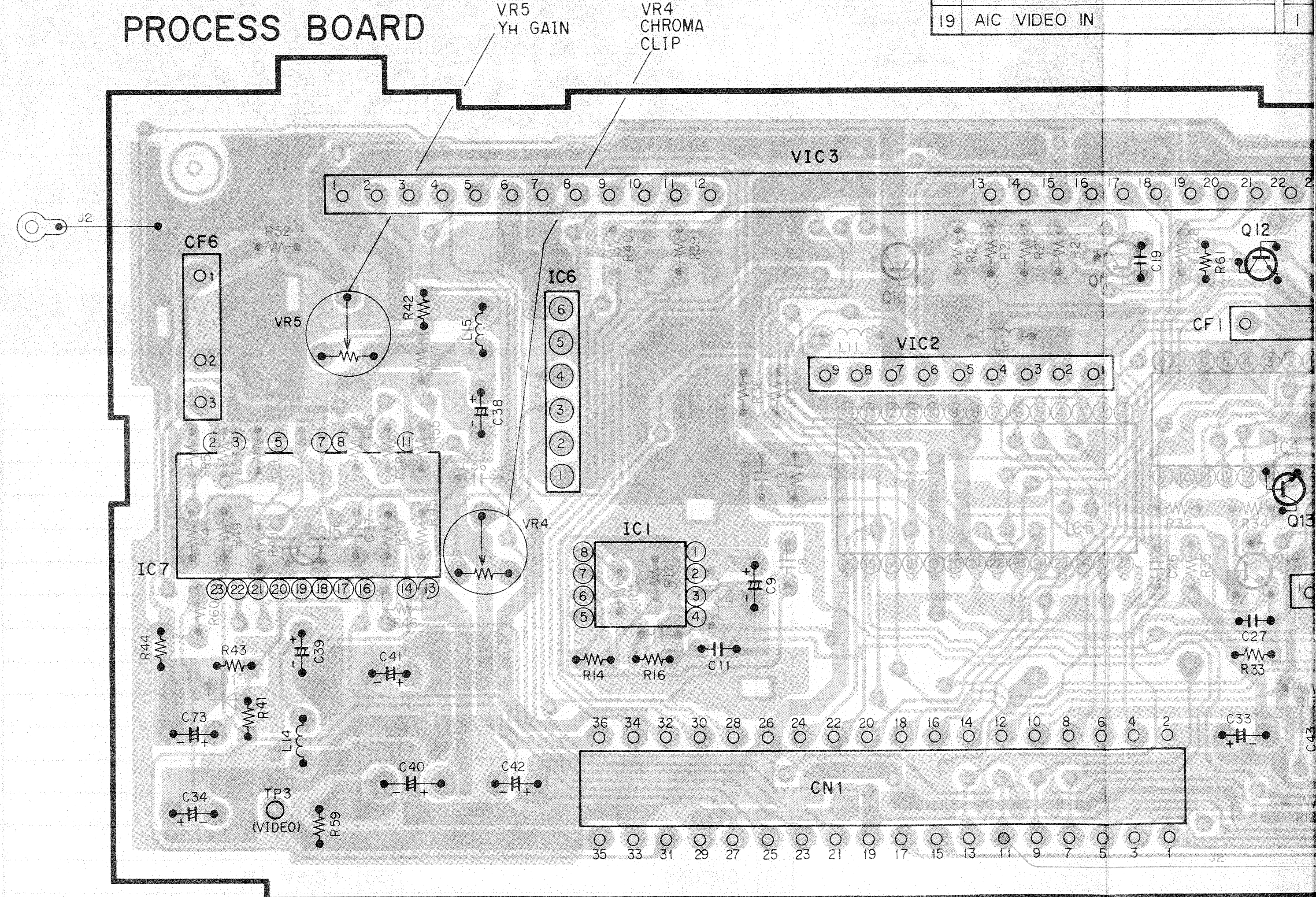
CN I

TO MOTHER BOARD

36	GROUND	18
35	VIDEO OUT	17
34	+1.8V IN	16
33	+4.9V IN	15
32	SC2 IN	14
31	GAIN CONTROL IN	13
30	WHD IN	12
29	GROUND	11
28	SYNC IN	10
27	PEDESTAL CONTOROL IN	9
26	NOT USED	8
25	CP2/WHD/BL IN	7
24	CP2 IN	6
23	CHARACTER IN	5
22	REF OUT	4
21	GAIN-UP CONTROL IN	3
20	ATW B CONTROL IN	2
19	AIC VIDEO IN	1

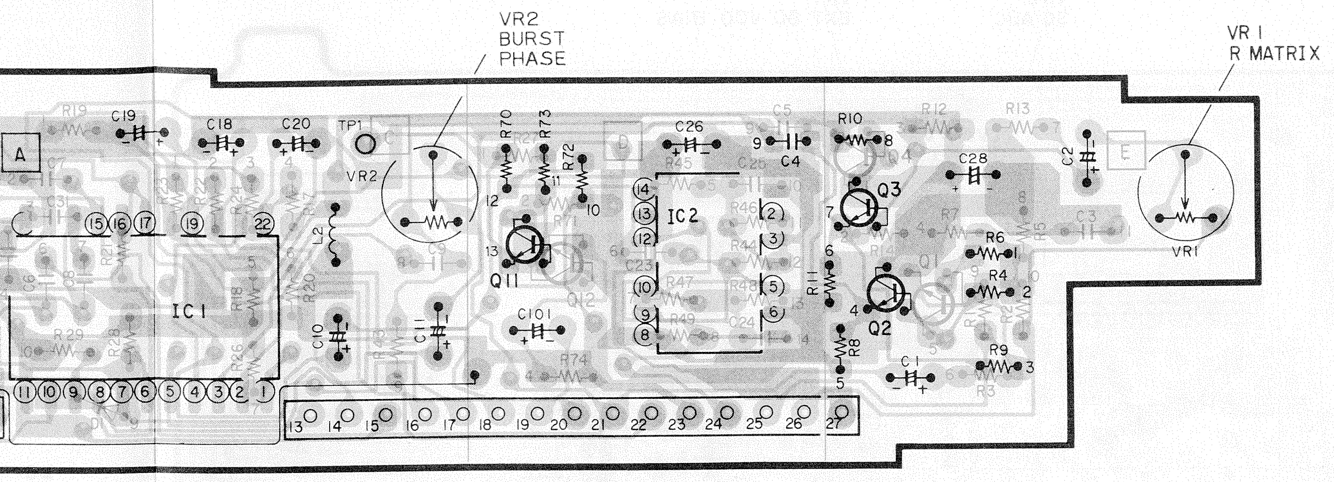

PROCESS VIC 2
VR I V.EDGE BALANCE
CF2
CF1
IC1
IC2
VR1
TP1 (V. EDGE)
Q1
Q2
D1
D2
E1
B


PROCESS VIC I
VR1 YH (IH) BIAS
VR2 YH (IH) GAIN
Q1
Q4
TP1 (YH(IH)BIAS)
IC1
CF1
E1
A


PROCESS BOARD
VR5 YH GAIN
VR4 CHROMA CLIP
VIC3
VIC2
CF6
CF1
IC1
IC6
IC7
CN1
J2
TP3 (VIDEO)
Q12
Q13

1
2
3
4
5

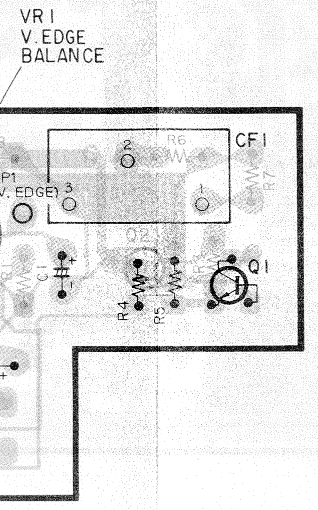
CONDUCTOR VIEW OF PROCESS BOARD

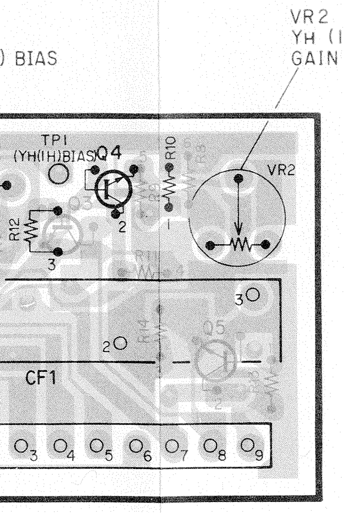

VR2
BURST
PHASE
VR1
R MATRIX
TP1
VR2
VR1
IC1
IC2
Q11
Q12
Q2
Q3
A
E

TO MOTHER BOARD

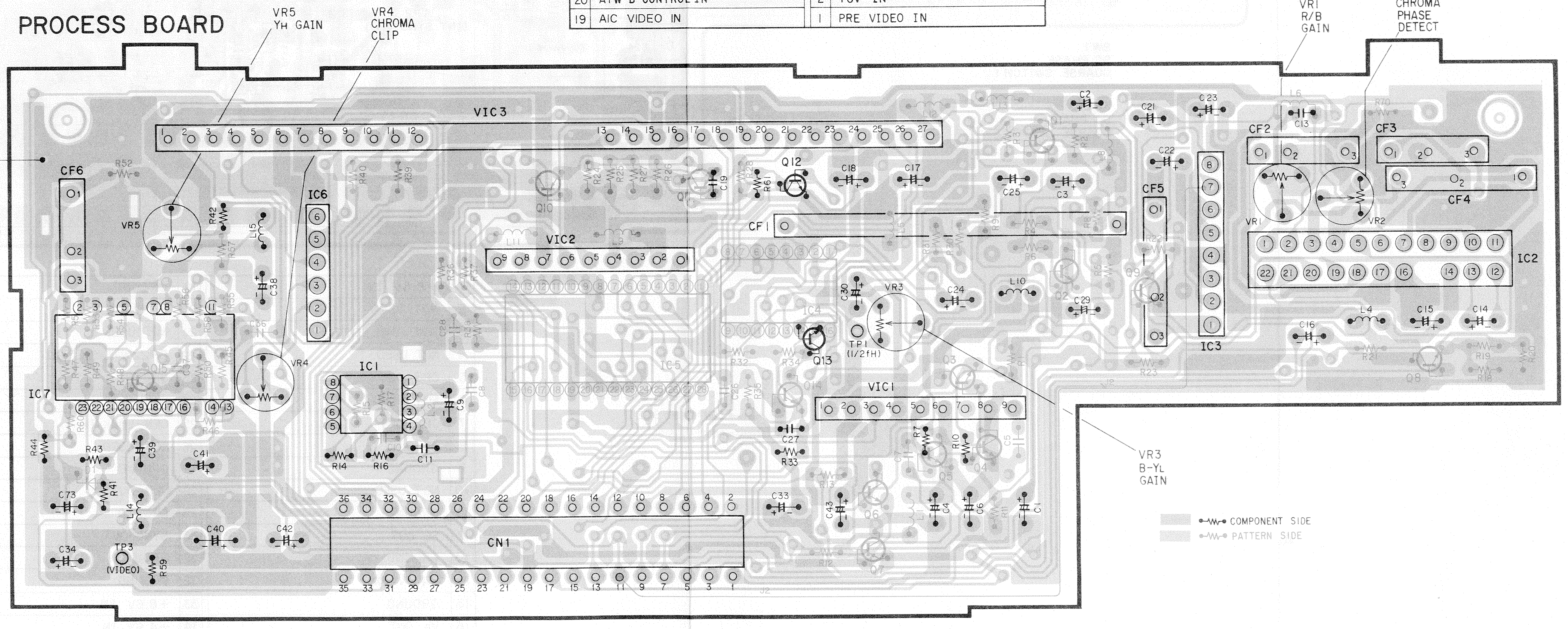
CN1

36	GROUND	18	B CONTROL IN
35	VIDEO OUT	17	R SC IN
34	+1.8V IN	16	R GAIN CONTROL IN
33	+4.9V IN	15	YH IN
32	SC2 IN	14	B DETECT OUT
31	GAIN CONTROL IN	13	R CONTROL IN
30	WHD IN	12	R DETECT OUT
29	GROUND	11	SC1 IN
28	SYNC IN	10	+8.6V IN
27	PEDESTAL CONTOROL IN	9	APERTURE SIGNAL OUT
26	NOT USED	8	ATW GATE PULSE IN
25	CP2/WHD/BL IN	7	1/2 fH PULSE IN
24	CP2 IN	6	ATW R CONTROL IN
23	CHARACTER IN	5	CP5 IN
22	REF OUT	4	BFP IN
21	GAIN-UP CONTROL IN	3	AIC CONTROL OUT
20	ATW B CONTROL IN	2	+6V IN
19	AIC VIDEO IN	1	PRE VIDEO IN


VR1
V.EDGE
BALANCE
CF1
TP1
(V.EDGE)
Q1
Q2

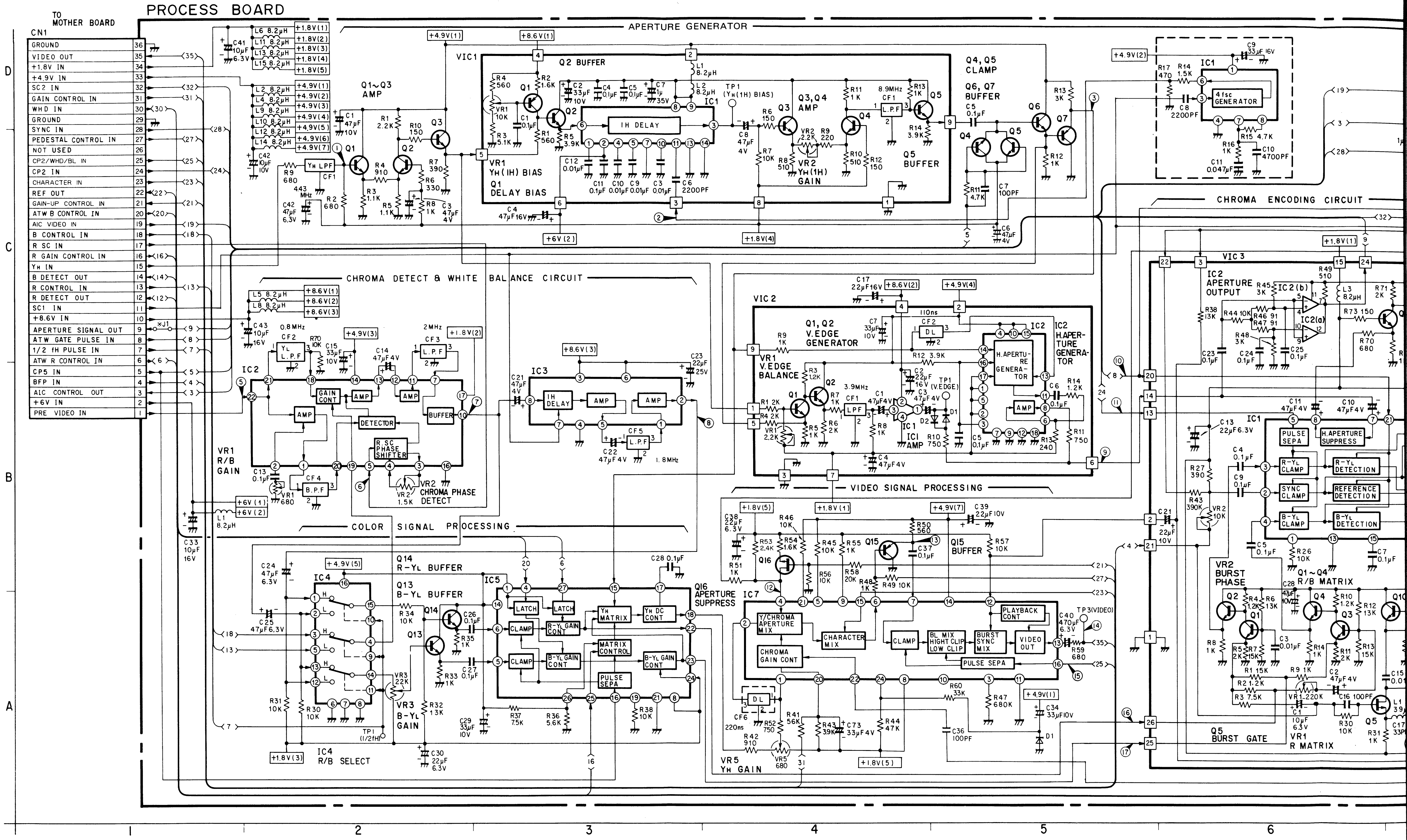

) BIAS
VR2
YH (IH)
GAIN
TP1
(YH(IH)BIAS)
Q4
Q5
VR2
CF1

PROCESS BOARD

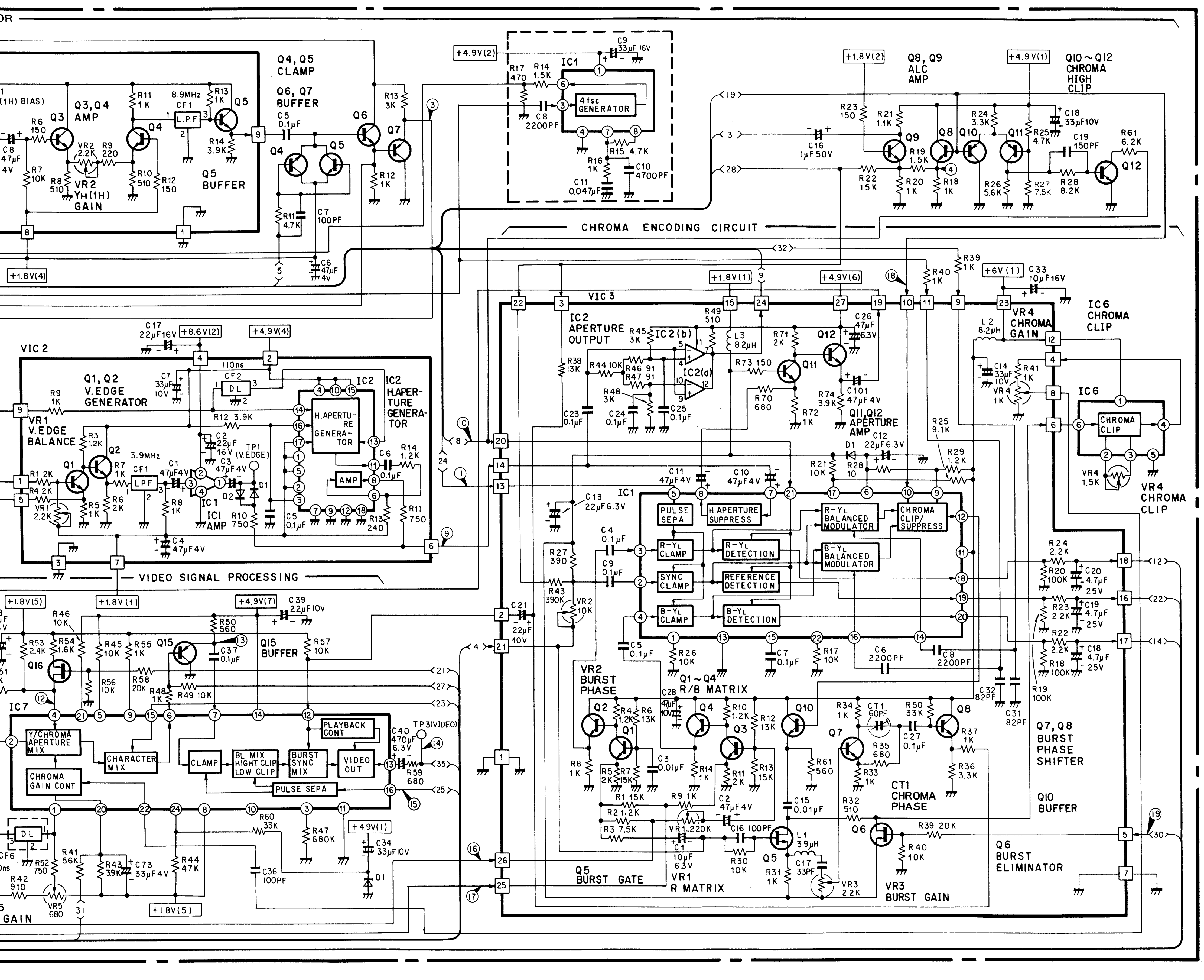

VR5
YH GAIN
VR4
CHROMA
CLIP
VR1
R/B
GAIN
VR2
CHROMA
PHASE
DETECT
VIC3
VIC2
VIC1
IC1
IC2
IC3
IC4
IC5
IC6
IC7
CF1
CF2
CF3
CF4
CF5
CF6
J2
Q10
Q12
Q13
TP1
(1/2fH)
TP3
(VIDEO)
CN1
VR3
B-YL
GAIN
COMPONENT SIDE
PATTERN SIDE

2 3 4 5 6 7

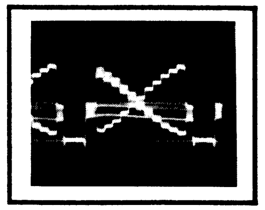
SCHEMATIC DIAGRAM OF PROC


PROCESS BOARD
TO MOTHER BOARD
CN1
GROUND 36
VIDEO OUT 35
+1.8V IN 34
+4.9V IN 33
SC2 IN 32
GAIN CONTROL IN 31
WHD IN 30
GROUND 29
SYNC IN 28
PEDESTAL CONTROL IN 27
NOT USED 26
CP2/WHD/BL IN 25
CP2 IN 24
CHARACTER IN 23
REF OUT 22
GAIN-UP CONTROL IN 21
ATW B CONTROL IN 20
AIC VIDEO IN 19
B CONTROL IN 18
R SC IN 17
R GAIN CONTROL IN 16
YH IN 15
B DETECT OUT 14
R CONTROL IN 13
R DETECT OUT 12
SC1 IN 11
+8.6V IN 10
APERTURE SIGNAL OUT 9
ATW GATE PULSE IN 8
1/2 fH PULSE IN 7
ATW R CONTROL IN 6
CP5 IN 5
BFP IN 4
AIC CONTROL OUT 3
+6V IN 2
PRE VIDEO IN 1
APERTURE GENERATOR
VIC1
Q2 BUFFER
Q1~Q3 AMP
1H DELAY
VR1 YH(1H) BIAS
Q1 DELAY BIAS
TP1 (YH(1H) BIAS)
Q3,Q4 AMP
VR2 YH(1H) GAIN
8.9MHz CF1 L.P.F
Q5 BUFFER
Q4,Q5 CLAMP
Q6,Q7 BUFFER
YH LPF
4fsc GENERATOR
IC1
CHROMA ENCODING CIRCUIT
CHROMA DETECT & WHITE BALANCE CIRCUIT
IC2
YL L.P.F
GAIN CONT
AMP
DETECTOR
BUFFER
R.SC PHASE SHIFTER
B.P.F
VR1 R/B GAIN
VR2 CHROMA PHASE DETECT
IC3
1H DELAY
L.P.F
COLOR SIGNAL PROCESSING
IC4
IC4 R/B SELECT
Q14 R-YL BUFFER
Q13 B-YL BUFFER
VR3 B-YL GAIN
TP1 (1/2fH)
IC5
LATCH
CLAMP
R-YL GAIN CONT
B-YL GAIN CONT
YH MATRIX
YH DC CONT
MATRIX CONTROL
PULSE SEPA
VIC2
Q1,Q2 V.EDGE GENERATOR
VR1 V.EDGE BALANCE
IC1 AMP
TP1 (V.EDGE)
IC2 H.APERTURE GENERATOR
H.APERTURE GENERATOR
DL
LPF
VIDEO SIGNAL PROCESSING
Q16 APERTURE SUPPRESS
Q15 BUFFER
IC7
Y/CHROMA APERTURE MIX
CHROMA GAIN CONT
CHARACTER MIX
CLAMP
BL MIX HIGHT CLIP LOW CLIP
BURST SYNC MIX
VIDEO OUT
PLAYBACK CONT
PULSE SEPA
TP3(VIDEO)
VR5 YH GAIN
CF6 220ns
VIC3
IC2 APERTURE OUTPUT
IC1
PULSE SEPA
H.APERTURE SUPPRESS
R-YL CLAMP
R-YL DETECTION
SYNC CLAMP
REFERENCE DETECTION
B-YL CLAMP
B-YL DETECTION
VR2 BURST PHASE
Q1~Q4 R/B MATRIX
Q5 BURST GATE
VR1 R MATRIX
D
C
B
A
1
2
3
4
5
6

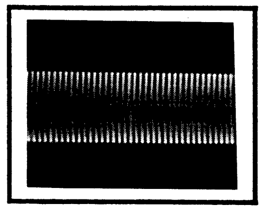
SCHEMATIC DIAGRAM OF PROCESS BOARD


Q4, Q5 CLAMP
Q6, Q7 BUFFER
Q5 BUFFER
Q3, Q4 AMP
VR2 YH(1H) GAIN
IC1 4fsc GENERATOR
Q8, Q9 ALC AMP
Q10 ~ Q12 CHROMA HIGH CLIP
CHROMA ENCODING CIRCUIT
VIC 2
VIC 3
Q1, Q2 V.EDGE GENERATOR
VR1 V.EDGE BALANCE
IC1 AMP
IC2 H.APERTURE GENERATOR
VIDEO SIGNAL PROCESSING
IC2 APERTURE OUTPUT
Q11, Q12 APERTURE AMP
VR4 CHROMA GAIN
IC6 CHROMA CLIP
VR4 CHROMA CLIP
IC1
PULSE SEPA
H.APERTURE SUPPRESS
R-YL CLAMP
R-YL DETECTION
SYNC CLAMP
REFERENCE DETECTION
B-YL CLAMP
B-YL DETECTION
R-YL BALANCED MODULATOR
B-YL BALANCED MODULATOR
CHROMA CLIP/SUPPRESS
VR2 BURST PHASE
Q1 ~ Q4 R/B MATRIX
Q7, Q8 BURST PHASE SHIFTER
CT1 CHROMA PHASE
Q10 BUFFER
Q6 BURST ELIMINATOR
Q5 BURST GATE
VR1 R MATRIX
VR3 BURST GAIN
Q15 BUFFER
IC7
Y/CHROMA APERTURE MIX
CHARACTER MIX
CLAMP
BL MIX HIGHT CLIP LOW CLIP
BURST SYNC MIX
VIDEO OUT
PLAYBACK CONT
PULSE SEPA
CHROMA GAIN CONT
TP3(VIDEO)
GAIN
+4.9V(2)
+1.8V(2)
+4.9V(1)
+1.8V(4)
+8.6V(2)
+4.9V(4)
+1.8V(1)
+4.9V(6)
+6V(1)
+1.8V(5)
+4.9V(7)
4
5
6
7
8

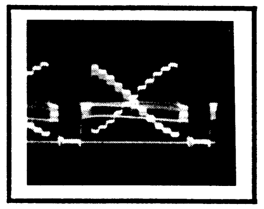
1. 50mV/DIV, 10µs/DIV



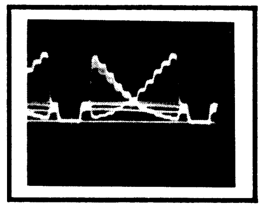
2. 0.2V/DIV, 0.2µs/DIV



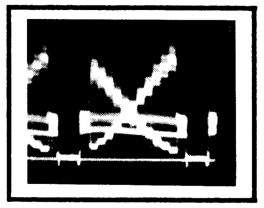
3. 0.1V/DIV, 10µs/DIV



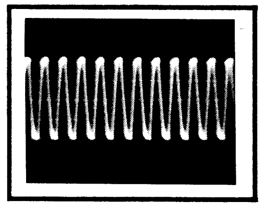
4. 0.2V/DIV 10µs/DIV



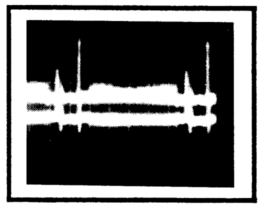
5. 0.1V/DIV, 10µs/DIV



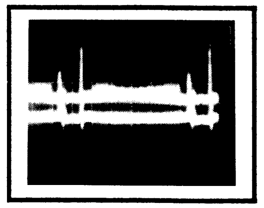
6. 0.2V/DIV, 0.2µs/DIV



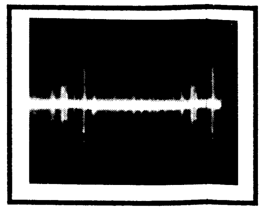
7. 50mV/DIV, 10µs/DIV



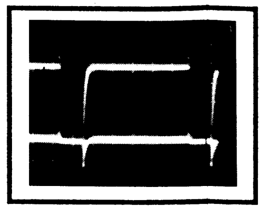
8. 50mV/DIV, 10µs/DIV



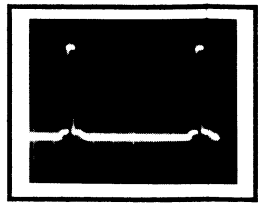
9. 0.1V/DIV, 10µs/DIV



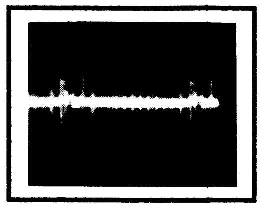
10. 0.2V/DIV, 10µs/IDIV



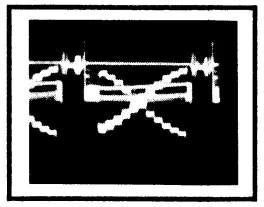
11. 1V/DIV, 10µs/DIV



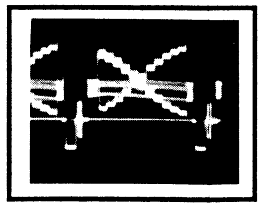
12. 50mV/DIV, 10µs/DIV



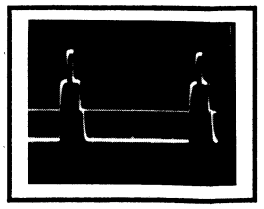
13. 0.2V/DIV, 10µs/DIV



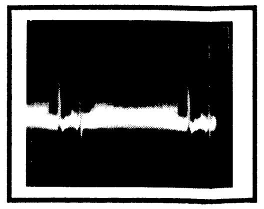
14. 0.2V/DIV, 10µs/DIV



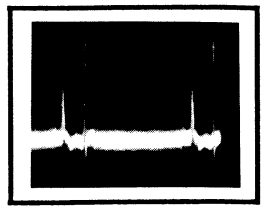
15. 1V/DIV, 10µs/DIV



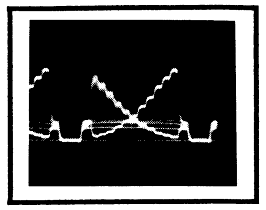
16. 20mV/DIV, 10µs/DIV



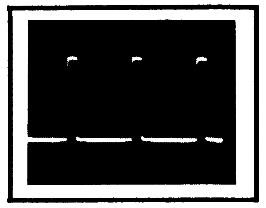
17. 20mV/DIV, 10µs/DIV



18. 0.2V/DIV, 10µs/DIV



19. 1V/DIV, 20µs/DIV



PROC

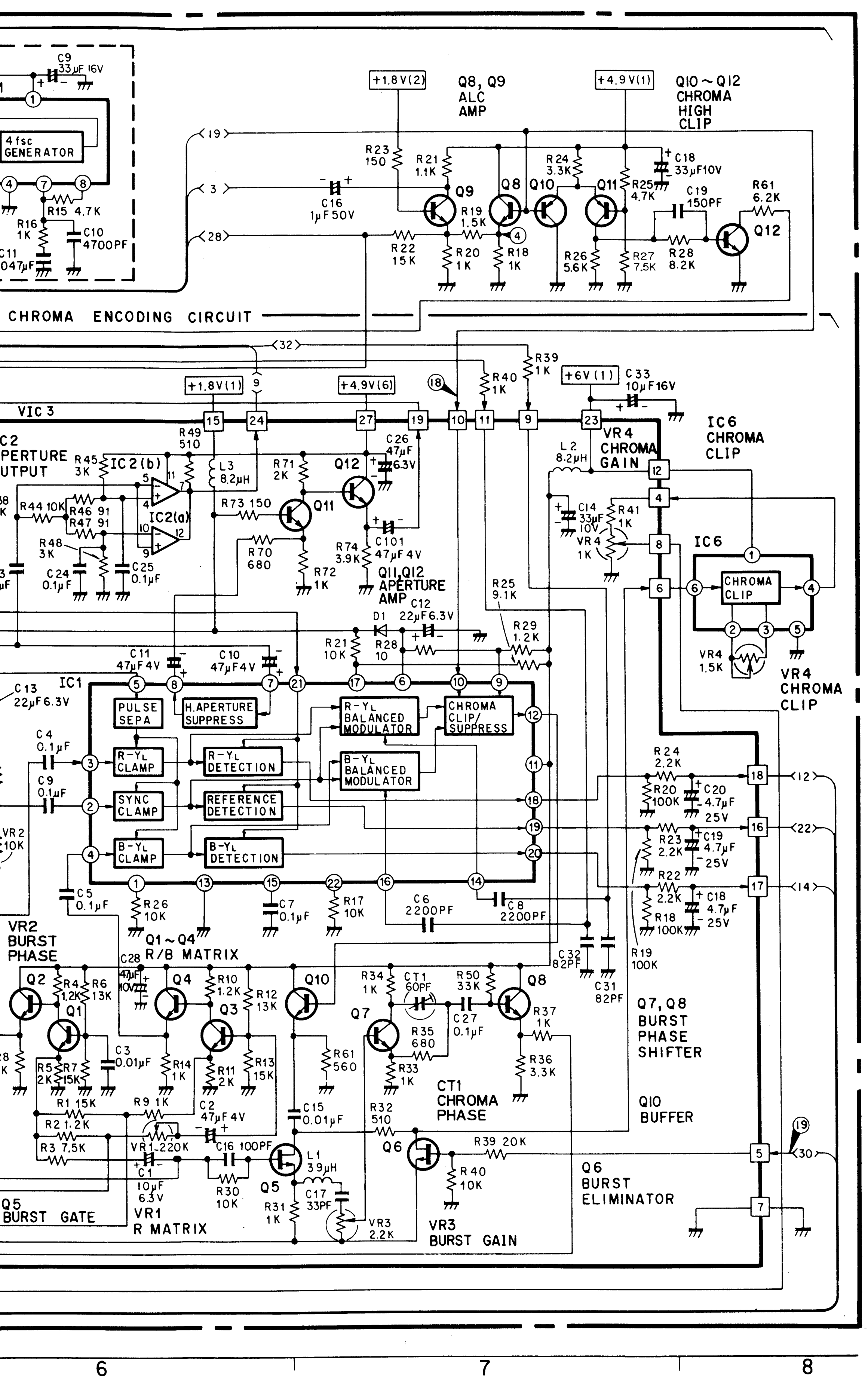
B	
C	
E	

PROCESS VIC-3 BOARD

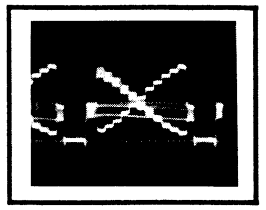
	IC1	IC2
Pin 1	----	0
2	1.6	0
3	3.1	0
4	3.1	2.4
5	0.7	2.3
6	2.4	0-
7	2.0	4.6
8	3.6	0
9	2.4	2.3
10	2.0	2.4
11	5.7	4.7
12	2.6	4.6
13	0	0
14	4.2	0
15	2.4	
16	4.2	
17	3.8	
18	2.3	
19	2.3	
20	2.3	
21	2.1	
22	0	

Q1	
Q2	
Q3	
Q4	
Q5	G
Q6	G
Q7	
Q8	
Q10	
Q11	
Q12	

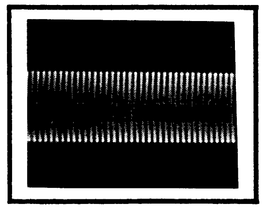
DIAGRAM OF PROCESS BOARD


C9 33μF 16V
4fsc GENERATOR
R15 4.7K
R16 1K
C10 4700PF
C11 .047μF
+1.8V(2)
Q8, Q9 ALC AMP
+4.9V(1)
Q10 ~ Q12 CHROMA HIGH CLIP
R23 150
R21 1.1K
R24 3.3K
C18 33μF10V
C16 1μF 50V
Q9
Q8
Q10
Q11
R25 4.7K
C19 150PF
R61 6.2K
Q12
R19 1.5K
R22 15K
R20 1K
R18 1K
R26 5.6K
R27 7.5K
R28 8.2K
CHROMA ENCODING CIRCUIT
VIC 3
+1.8V(1)
+4.9V(6)
R40 1K
R39 1K
+6V(1)
C33 10μF16V
IC6 CHROMA CLIP
R49 510
C2 APERTURE OUTPUT
R45 3K
IC2(b)
L3 8.2μH
R71 2K
Q12
C26 47μF 6.3V
L2 8.2μH
VR4 CHROMA GAIN
R44 10K
R46 91
R47 91
IC2(a)
R73 150
Q11
C14 33μF 10V
R41 1K
VR4 1K
R48 3K
C24 0.1μF
C25 0.1μF
R70 680
R72 1K
R74 3.9K
C101 47μF 4V
Q11,Q12 APERTURE AMP
C12 22μF6.3V
D1
R25 9.1K
IC6
CHROMA CLIP
VR4 1.5K
VR4 CHROMA CLIP
R21 10K
R28 10
R29 1.2K
C11 47μF4V
C10 47μF4V
C13 22μF6.3V
IC1
PULSE SEPA
H.APERTURE SUPPRESS
R-YL BALANCED MODULATOR
CHROMA CLIP/ SUPPRESS
C4 0.1μF
R-YL CLAMP
R-YL DETECTION
B-YL BALANCED MODULATOR
C9 0.1μF
SYNC CLAMP
REFERENCE DETECTION
B-YL CLAMP
B-YL DETECTION
VR2 10K
R24 2.2K
R20 100K
C20 4.7μF 25V
R23 2.2K
C19 4.7μF 25V
R22 2.2K
C18 4.7μF 25V
R18 100K
C5 0.1μF
R26 10K
C7 0.1μF
R17 10K
C6 2200PF
C8 2200PF
Q1 ~ Q4 R/B MATRIX
VR2 BURST PHASE
C28 47μF 10V
Q2
R4 1.2K
R6 13K
Q1
Q4
R10 1.2K
R12 13K
Q3
Q10
R34 1K
CT1 60PF
R50 33K
Q8
C32 82PF
R19 100K
C31 82PF
Q7,Q8 BURST PHASE SHIFTER
R5 2K
R7 15K
C3 0.01μF
R14 1K
R11 2K
R13 15K
R61 560
Q7
R35 680
C27 0.1μF
R37 1K
R33 1K
R36 3.3K
CT1 CHROMA PHASE
Q10 BUFFER
R1 15K
R9 1K
R2 1.2K
R3 7.5K
C2 47μF 4V
C15 0.01μF
R32 510
R39 20K
VR1 220K
C16 100PF
L1 3.9μH
Q6
C1 10μF 6.3V
R30 10K
Q5
C17 33PF
R40 10K
Q6 BURST ELIMINATOR
Q5 BURST GATE
VR1 R MATRIX
R31 1K
VR3 2.2K
VR3 BURST GAIN
6
7
8

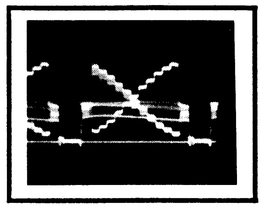
1. 50mV/DIV, 10μs/DIV



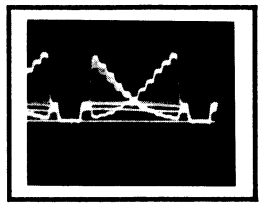
2. 0.2V/DIV, 0.2μs/DIV



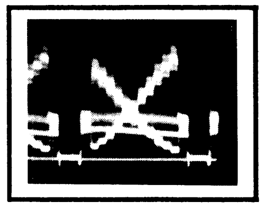
3. 0.1V/DIV, 10μs/DIV



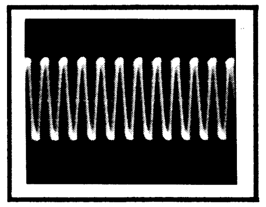
4. 0.2V/DIV 10μs/DIV



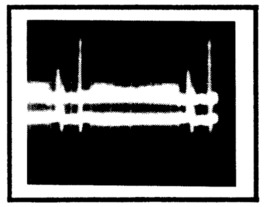
5. 0.1V/DIV, 10μs/DIV



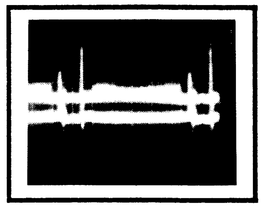
6. 0.2V/DIV, 0.2μs/DIV



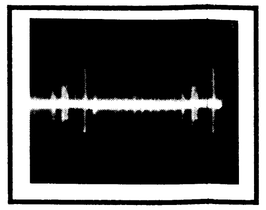
7. 50mV/DIV, 10μs/DIV



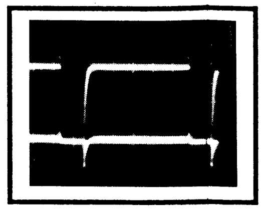
8. 50mV/DIV, 10μs/DIV



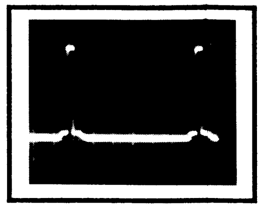
9. 0.1V/DIV, 10μs/DIV



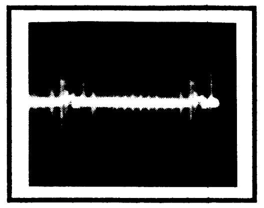
10. 0.2V/DIV, 10μs/IDIV



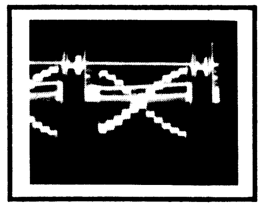
11. 1V/DIV, 10μs/DIV



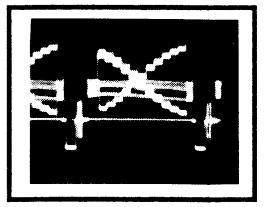
12. 50mV/DIV, 10μs/DIV



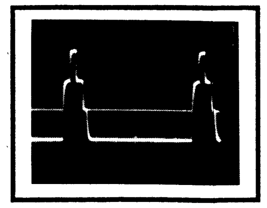
13. 0.2V/DIV, 10μs/DIV



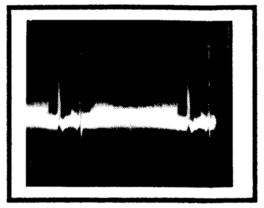
14. 0.2V/DIV, 10μs/DIV



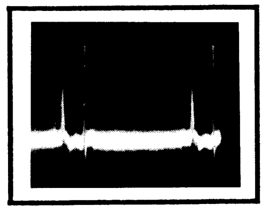
15. 1V/DIV, 10μs/DIV



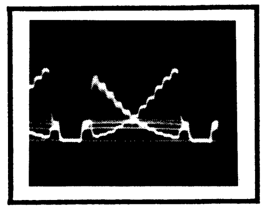
16. 20mV/DIV, 10μs/DIV



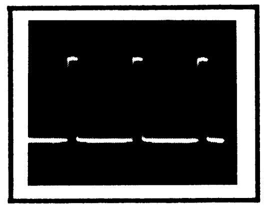
17. 20mV/DIV, 10μs/DIV



18. 0.2V/DIV, 10μs/DIV



19. 1V/DIV, 20μs/DIV



PROCESS BOARD

	IC1	IC2	IC3	IC4	IC5	IC6	IC7
Pin 1	4.7	0	1.3	1.7	4.6	5.7	1.8
2	2.3	1.1	0	1.7	1.8	1.2	1.8
3	0	1.0	8.2	1.7	2.5	3.5	1.8
4	0	0	0	1.7	1.8	2.2	0
5	7.9	1.5	3.7	1.7	1.7	0	0
6	15.8	0	8.2	0	1.7	1.8	2.6
7	1.5	3.5	1.5	0	3.1		1.5
8	1.5	0	2.5	0	1.7		0
9		2.9		2.3	3.1		1.7
10		2.3		2.3	2.5		2.3
11		3.5		2.3	0		0
12		1.1		1.7	0		1.7
13		1.4		1.7	0.7		2.4
14		4.6		1.6	4.6		4.6
15		---		1.7	1.9		0
16		0		4.9	0.1		0.7
17		1.7			2.9		0
18		0			2.0		0
19		1.7			0		0
20		1.7			2.4		1.7
21		1.8			0		4.6
22		2.0			2.4		1.7
23					2.3		2.7
24					1.7		1.7
25					1.7		
26					2.0		
27					1.7		
28					2.4		

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
B	1.8	1.7	2.7	0	0.1	1.8	1.3	1.9	1.7	1.9	2.9	0	1.7	1.7	2.6	G 1.5
C	4.7	2.7	4.6	1.7	1.9	4.6	0	4.6	3.6	0	0	2.1	4.6	4.2	0	D 1.7
E	1.2	1.1	2.0	1.9	1.7	1.3	1.9	1.3	1.1	2.6	2.6	0	1.1	1.1	3.2	S 1.7

PROCESS VIC-1 BOARD

	IC1
Pin 1	---
2	6.0
3	1.2
4	---
5	---
6	2.2
7	0
8	4.9
9	4.9
10	3.5
11	1.4
12	0
13	---
14	0
15	
16	
17	

	Q1	Q2	Q3
B	5.4	2.8	1.6
C	2.7	4.6	4.6
E	6.0	2.2	0.9
	Q4	Q5	
B	1.7	3.5	
C	3.5	4.6	
E	1.0	2.9	

PROCESS VIC-2 BOARD

	IC1	IC2
Pin 1	4.8	1.8
2	8.6	1.8
3	2.1	2.5
4	0	4.9
5		1.8
6		1.8
7		0
8		2.0
9		0
10		4.9
11		2.0
12		0
13		1.9
14		1.9
15		4.9
16		2.5
17		1.8
18		0

	Q1	Q2
B	2.0	3.3
C	1.1	4.7
E	3.3	2.7

PROCESS VIC-3 BOARD

	IC1	IC2
Pin 1	----	0
2	1.6	0
3	3.1	0
4	3.1	2.4
5	0.7	2.3
6	2.4	0-
7	2.0	4.6
8	3.6	0
9	2.4	2.3
10	2.0	2.4
11	5.7	4.7
12	2.6	4.6
13	0	0
14	4.2	0
15	2.4	
16	4.2	
17	3.8	
18	2.3	
19	2.3	
20	2.3	
21	2.1	
22	0	

	B	C	E
Q1	3.0	4.3	2.4
Q2	4.3	5.7	3.6
Q3	3.0	4.2	2.4
Q4	4.2	5.7	3.6
Q5	G 1.7	D 1.8	S 1.7
Q6	G 0.2	D 1.8	S 0
Q7	1.7	4.7	1.0
Q8	5.4	5.7	4.7
Q10	2.6	5.7	1.9
Q11	1.7	2.6	1.0
Q12	2.6	4.7	1.9

Process Board

IC1	MN3106S		D6
IC2	HB12		B2
IC3	HB18		B3
IC4	NJU4053BM		A2
IC5	AN2361S		A3
IC6	HB16		B8
IC7	AN2210SA		A4
Q1	2SD601-QR	(Y)	C2
Q2	2SD601-QR	(Y)	C2
Q3	2SD601-QR	(Y)	C2
Q4	2SC2404-CDTW	(U)	C5
Q5	2SC2404-CDTW	(U)	C5
Q6	2SD601-QR	(Y)	D5
Q7	2SB709-Q	(A)	C5
Q8	2SD601-QR	(Y)	C7
Q9	2SD601-QR	(Y)	C7
Q10	2SA1022-BCTX	(E)	C7
Q11	2SA1022-BCTX	(E)	C7
Q12	2SC2404-CDTX	(U)	C8
Q13	2SD601-QR	(Y)	A2
Q14	2SD601-QR	(Y)	A2
Q15	2SB709-Q	(A)	B4
Q16	2SK198-Q	(1Q)	B4
D1	MA151KTX	(MH)	A5

Process VIC-1 Board

IC1	MN3802A		D3
Q1	2SB709-Q	(A)	D3
Q2	2SD601-QR	(W)	D3
Q3	2SC2404-CDTW	(U)	D4
Q4	2SC2404-CDTW	(U)	D4
Q5	2SD601-QR	(W)	D4

Process VIC-2 Board

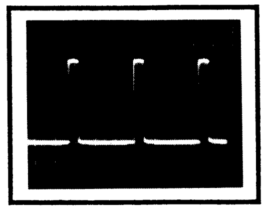
IC1	AN608		B4
IC2	AN2020S		B5
Q1	2SC2404-CDTW	(U)	B4
Q2	2SD601-QR	(Y)	B4
D1	1SS108		B5
D2	1SS108		B5

Process VIC-3 Board

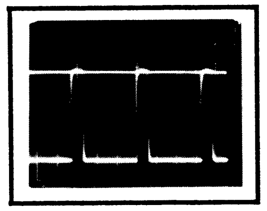
IC1	AN2410S		B7
IC2	NJM319M		C6
Q1	2SD601-QR	(Y)	A6
Q2	2SD601-QR	(Y)	A6
Q3	2SD601-QR	(Y)	A6
Q4	2SD601-QR	(Y)	A6
Q5	2SK198-Q	(1Q)	A6
Q6	2SK198-Q	(1Q)	A7
Q7	2SC2404-CDTW	(U)	A7
Q8	2SC2404-CDTW	(U)	A7
Q10	2SC2404-CDTW	(U)	A7
Q11	2SC2404-CDTW	(U)	C7
Q12	2SD601-QR	(Y)	C7
D1	MA151KTX	(MH)	B7

	CCD image sensor without IC5 on Process board	CCD image sensor with IC5 on Process board
J1	Not Used	Used

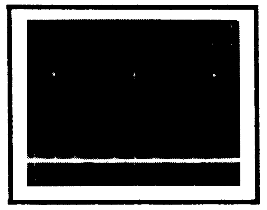
1. 1V/DIV, 20μs/DIV



2. 1V/DIV, 20μs/DIV



3. 1V/DIV, 5ms/DIV



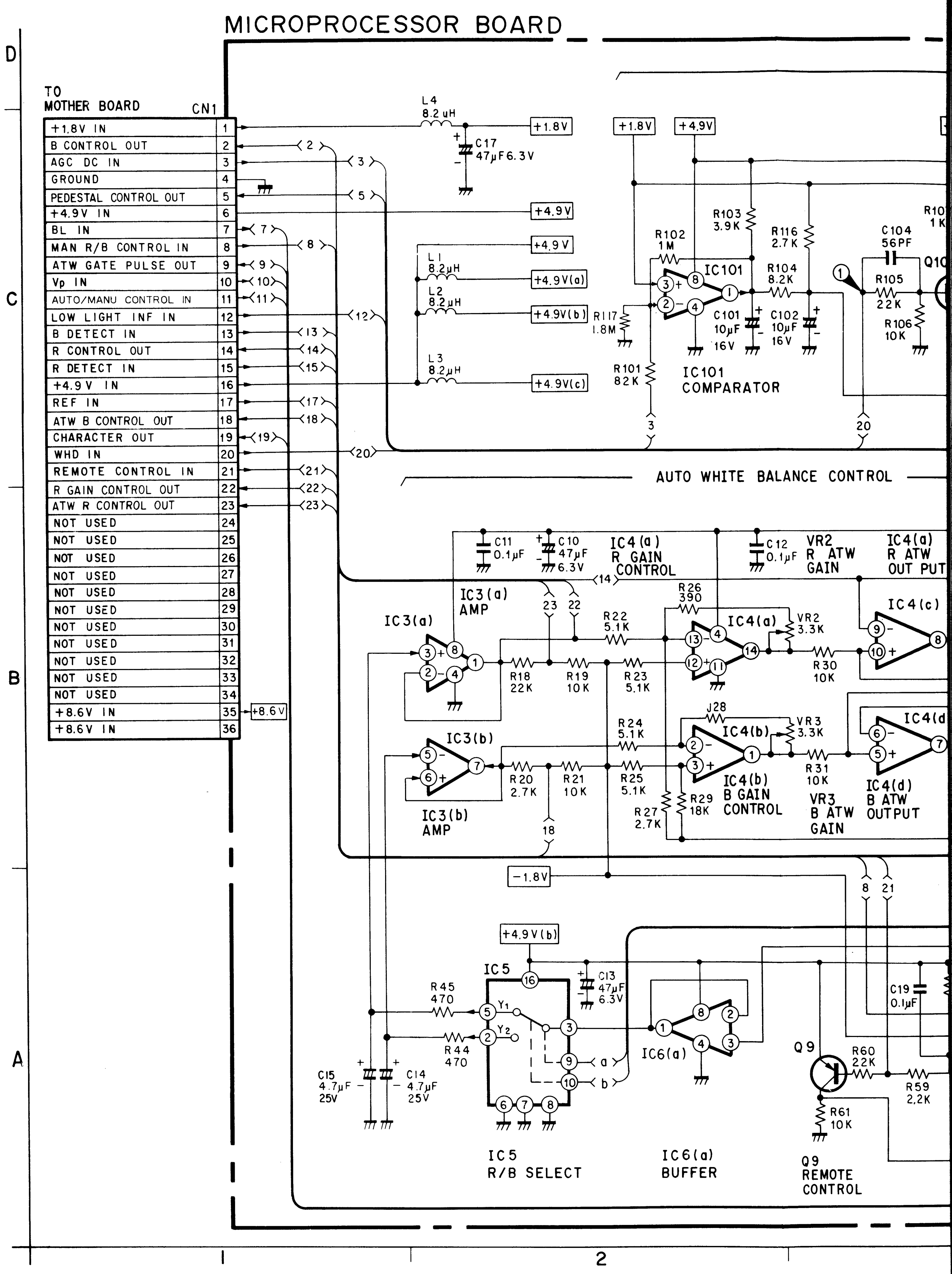
	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC10	IC11	IC101
Pin 1	4.7	4.7	1.6	1.7	1.7	1.8	3.8	0	4.3	5.0	0	0.1
2	4.7	4.7	1.6	1.7	1.8	1.8	2.3	0.1	0.1	0	4.6	1.7
3	4.7	4.7	1.6	1.7	1.8	1.8	2.3	0.1	4.1	5.0	0.3	1.7
4	4.7	4.7	0	5.0	0.1	0	0	0.1	4.5		0.1	0
5	4.7	4.7	1.8	1.7	1.7	1.7	2.3	0.1	0		0	0.3
6	0	0	1.8	1.7	0	1.7	2.3	0	0		0	0.3
7	0	0	0	1.7	0	1.7	2.1	0	4.6		0	0
8	0	0	5.0	1.7	0	5.0	5.0	0	0		0	4.9
9	4.2	4.2		1.7	0			0	4.6		0	
10	4.3	4.3		1.7	0			4.7	1.7		0	
11	4.7	4.7		0	0.1			0	4.3		0.7	
12	4.7	4.7		1.7	0.1			1.8	3.5		0	
13	4.7	4.7		1.7	0.1			1.7	4.6		0	
14	4.7	4.7		1.7	0.1			1.8	4.6		0	
15	4.7	4.7			4.7			4.7	3.9		4.6	
16	4.7	4.7			5.0			5.0	0		0	
17									4.7		4.1	
18									0		0	
19									2.0		0.3	
20									2.0		4.3	
21									4.6		4.2	
22									0.1		4.6	
23									4.6		4.3	
24									4.7		4.6	
25									4.6			
26									4.6			
27									4.6			
28									1.5			
29									1.5			
30									0			
31									0			
32									4.6			
33									4.5			
34									4.2			
35									4.6			
36									0			
37									4.6			
38									0			
39									0			
40									3.8			
41									2.1			
42									4.2			

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q101	Q102	Q103	Q104
B	0	4.0	0	2.2	0	0	0	0	4.6	4.3	1.1	0.1	0.5	1.3	1.7
C	4.7	4.5	4.7	4.2	4.2	4.2	4.7	4.7	0	3.6	2.1	6.1	0.3	0	2.3
E	0	5.0	0	1.7	0.1	0	0.1	0	5.0	5.0	1.8	0	0	0.3	1.1

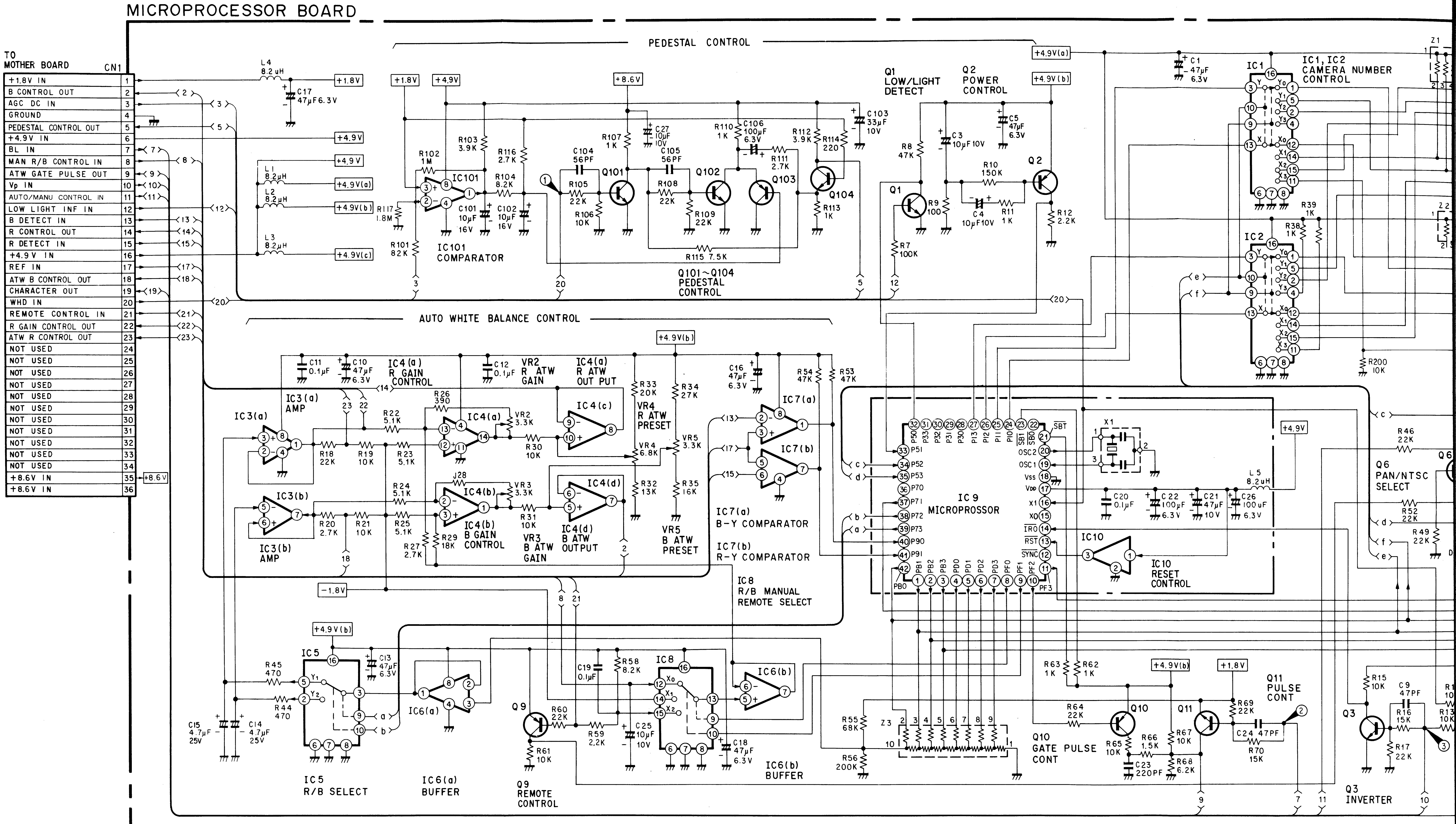
Microprocessor Board

IC1	NJU4052BM		C6
IC2	NJU4052BM		C6
IC3	NJM2904M		B2
IC4	NJM2902M		B2, B3
IC5	NJU4052BM		A2
IC6	NJM2904M		A2, A3
IC7	AN6914S		B4
IC8	NJU4052BM		A3
IC9	MN1552CVY		B4
IC10	M51951AMLW		B5
IC11	M50450FP		A7
IC101	NJM2903M		C2
Q1	2SC2405RSTTW	(S)	C4
Q2	2SB709-Q	(A)	C5
Q3	2SD601-QR	(Y)	A6
Q4	2SD601-QR	(Y)	B7
Q5	2SD601-QR	(Y)	B6
Q6	2SD601-QR	(Y)	B6
Q7	2SD601-QR	(Y)	B7
Q8	2SD601-QR	(Y)	B6
Q9	2SB709-Q	(A)	A3
Q10	2SB709-Q	(A)	A5
Q11	2SD601-QR	(Y)	A5
Q101	2SD601-QR	(Y)	C3
Q102	2SD601-QR	(Y)	C3
Q103	2SB709-Q	(A)	C3
Q104	2SD601-QR	(Y)	C4
D1	MA151WK	(MU)	B7
D2	MA151WK	(MU)	B6
D3	MA151K	(MH)	B6

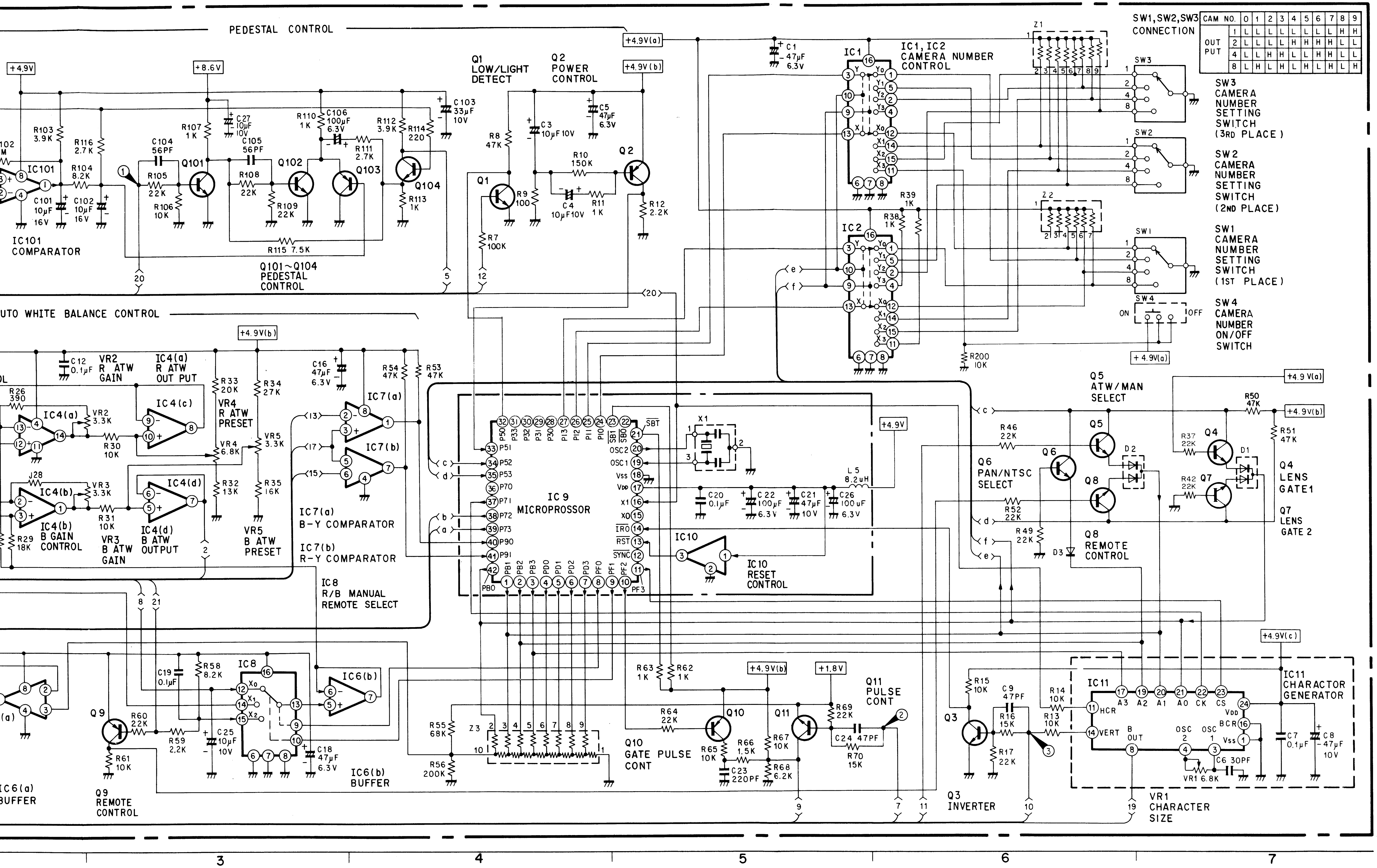
SCH


MICROPROCESSOR BOARD
D
C
B
A
1
2
TO MOTHER BOARD
CN1
+1.8V IN 1
B CONTROL OUT 2
AGC DC IN 3
GROUND 4
PEDESTAL CONTROL OUT 5
+4.9V IN 6
BL IN 7
MAN R/B CONTROL IN 8
ATW GATE PULSE OUT 9
Vp IN 10
AUTO/MANU CONTROL IN 11
LOW LIGHT INF IN 12
B DETECT IN 13
R CONTROL OUT 14
R DETECT IN 15
+4.9V IN 16
REF IN 17
ATW B CONTROL OUT 18
CHARACTER OUT 19
WHD IN 20
REMOTE CONTROL IN 21
R GAIN CONTROL OUT 22
ATW R CONTROL OUT 23
NOT USED 24
NOT USED 25
NOT USED 26
NOT USED 27
NOT USED 28
NOT USED 29
NOT USED 30
NOT USED 31
NOT USED 32
NOT USED 33
NOT USED 34
+8.6V IN 35
+8.6V IN 36
+8.6V
L4 8.2μH
C17 47μF6.3V
+1.8V
+4.9V
+4.9V(a)
+4.9V(b)
+4.9V(c)
L1 8.2μH
L2 8.2μH
L3 8.2μH
R102 1M
R103 3.9K
R116 2.7K
R104 8.2K
C104 56PF
R105 22K
R106 10K
R117 1.8M
R101 82K
C101 10μF 16V
C102 10μF 16V
IC101
IC101 COMPARATOR
AUTO WHITE BALANCE CONTROL
C11 0.1μF
C10 47μF 6.3V
C12 0.1μF
IC4(a) R GAIN CONTROL
VR2 R ATW GAIN
IC4(a) R ATW OUT PUT
IC3(a) AMP
IC3(a)
R26 390
R22 5.1K
IC4(a)
VR2 3.3K
IC4(c)
R18 22K
R19 10K
R23 5.1K
R30 10K
R24 5.1K
J28
IC4(b)
VR3 3.3K
IC4(d)
IC3(b)
R20 2.7K
R21 10K
R25 5.1K
R31 10K
R27 2.7K
R29 18K
IC4(b) B GAIN CONTROL
VR3 B ATW GAIN
IC4(d) B ATW OUTPUT
IC3(b) AMP
-1.8V
+4.9V(b)
IC5
C13 47μF 6.3V
R45 470
R44 470
C15 4.7μF 25V
C14 4.7μF 25V
IC6(a)
C19 0.1μF
Q9
R60 22K
R59 2.2K
R61 10K
IC5 R/B SELECT
IC6(a) BUFFER
Q9 REMOTE CONTROL

SCHEMATIC DIAGRAM OF MICROPROCESSOR BOARD


MICROPROCESSOR BOARD
TO MOTHER BOARD
CN1
+1.8V IN 1
B CONTROL OUT 2
AGC DC IN 3
GROUND 4
PEDESTAL CONTROL OUT 5
+4.9V IN 6
BL IN 7
MAN R/B CONTROL IN 8
ATW GATE PULSE OUT 9
Vp IN 10
AUTO/MANU CONTROL IN 11
LOW LIGHT INF IN 12
B DETECT IN 13
R CONTROL OUT 14
R DETECT IN 15
+4.9V IN 16
REF IN 17
ATW B CONTROL OUT 18
CHARACTER OUT 19
WHD IN 20
REMOTE CONTROL IN 21
R GAIN CONTROL OUT 22
ATW R CONTROL OUT 23
NOT USED 24
NOT USED 25
NOT USED 26
NOT USED 27
NOT USED 28
NOT USED 29
NOT USED 30
NOT USED 31
NOT USED 32
NOT USED 33
NOT USED 34
+8.6V IN 35
+8.6V IN 36
PEDESTAL CONTROL
IC101 COMPARATOR
Q101~Q104 PEDESTAL CONTROL
Q1 LOW/LIGHT DETECT
Q2 POWER CONTROL
IC1, IC2 CAMERA NUMBER CONTROL
AUTO WHITE BALANCE CONTROL
IC3(a) AMP
IC3(b) AMP
IC4(a) R GAIN CONTROL
VR2 R ATW GAIN
IC4(a) R ATW OUT PUT
IC4(b) B GAIN CONTROL
VR3 B ATW GAIN
IC4(d) B ATW OUTPUT
VR4 R ATW PRESET
VR5 B ATW PRESET
IC7(a) B-Y COMPARATOR
IC7(b) R-Y COMPARATOR
IC8 R/B MANUAL REMOTE SELECT
IC9 MICROPROCESSOR
IC10 RESET CONTROL
Q6 PAN/NTSC SELECT
IC5 R/B SELECT
IC6(a) BUFFER
Q9 REMOTE CONTROL
IC6(b) BUFFER
Q10 GATE PULSE CONT
Q11 PULSE CONT
Q3 INVERTER
X1
Z1
Z2
Z3
L4 8.2μH
L1 8.2μH
L2 8.2μH
L3 8.2μH
L5 8.2μH
C17 47μF 6.3V
+1.8V
+4.9V
+4.9V(a)
+4.9V(b)
+4.9V(c)
+8.6V
-1.8V
R102 1M
R103 3.9K
R116 2.7K
R104 8.2K
R117 1.8M
R101 82K
C101 10μF 16V
C102 10μF 16V
C104 56PF
R105 22K
R106 10K
R107 1K
C27 10μF 10V
C105 56PF
R108 22K
R109 22K
R110 1K
C106 100μF 6.3V
R111 2.7K
R112 3.9K
R114 220
C103 33μF 10V
R113 1K
R115 7.5K
R8 47K
C3 10μF 10V
C5 47μF 6.3V
R10 150K
C4 10μF 10V
R11 1K
R9 100
R7 100K
R12 2.2K
C1 47μF 6.3V
R38 1K
R39 1K
R200 10K
C11 0.1μF
C10 47μF 6.3V
C12 0.1μF
R26 390
R22 5.1K
R18 22K
R19 10K
R23 5.1K
VR2 3.3K
R30 10K
J28
R24 5.1K
R25 5.1K
R20 2.7K
R21 10K
R27 2.7K
R29 18K
VR3 3.3K
R31 10K
R33 20K
R34 27K
VR4 6.8K
VR5 3.3K
R32 13K
R35 16K
C16 47μF 6.3V
R54 47K
R53 47K
C20 0.1μF
C22 100μF 6.3V
C21 47μF 10V
C26 100μF 6.3V
R46 22K
R52 22K
R49 22K
R45 470
R44 470
C15 4.7μF 25V
C14 4.7μF 25V
C13 47μF 6.3V
C19 0.1μF
R58 8.2K
C25 10μF 10V
C18 47μF 6.3V
R60 22K
R59 2.2K
R61 10K
R55 68K
R56 200K
R63 1K
R62 1K
R64 22K
R65 10K
R66 1.5K
R67 10K
R68 6.2K
C23 220PF
R69 22K
C24 47PF
R70 15K
R15 10K
C9 47PF
R16 15K
R17 22K
P50 P33 P32 P31 P30 P13 P12 P11 P10 SB1 SB0 SBT
P51 P52 P53 P70 P71 P72 P73 P90 P91 PB0
OSC2 OSC1 Vss VDD X1 X0 IRQ RST SYNC
PB1 PB2 PB3 PD0 PD1 PD2 PD3 PF0 PF1 PF2 PF3
1 2 3 4 5 6

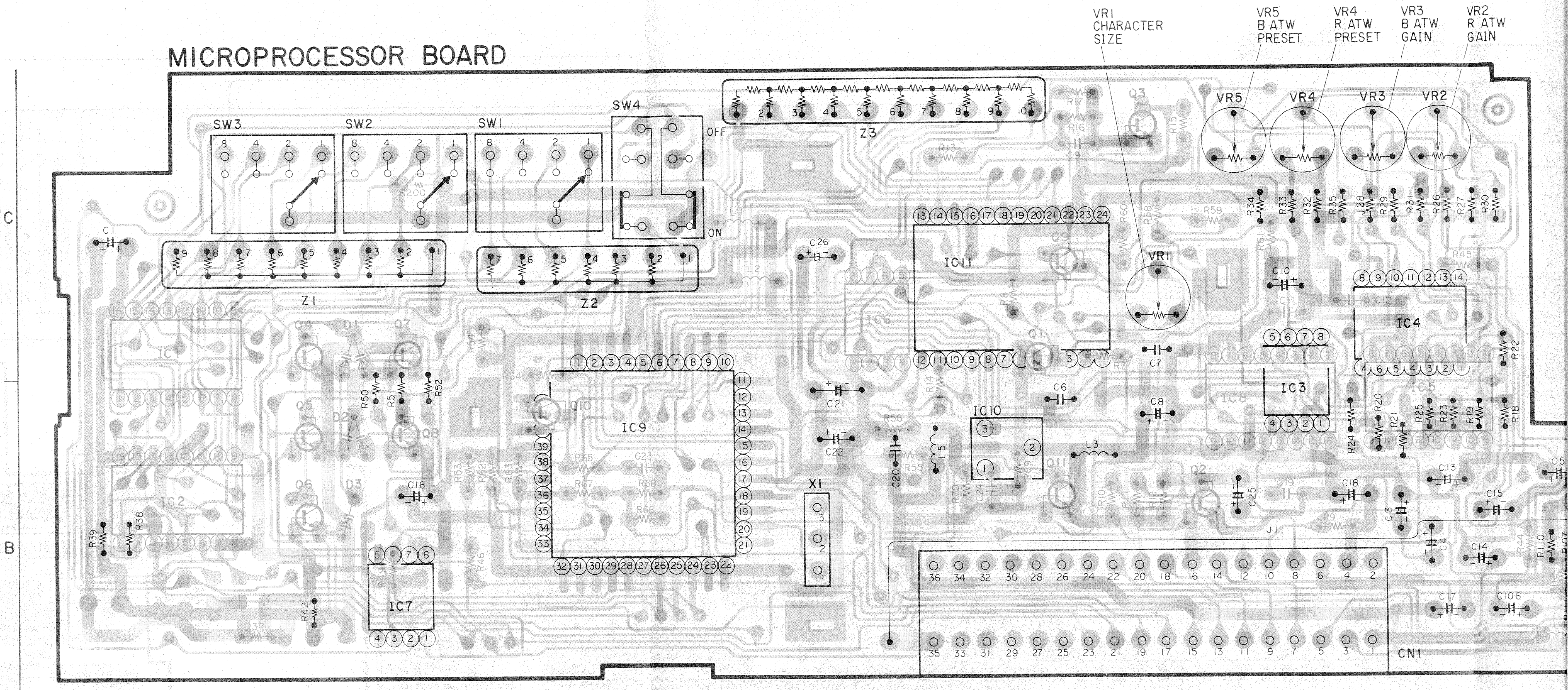
SCHEMATIC DIAGRAM OF MICROPROCESSOR BOARD


PEDESTAL CONTROL
+4.9V
+8.6V
+4.9V(a)
+4.9V(b)
R103 3.9K
R116 2.7K
C104 56PF
R107 1K
C27 10μF 10V
C105 56PF
R110 1K
C106 100μF 6.3V
R112 3.9K
R114 220
C103 33μF 10V
R111 2.7K
IC101
R104 8.2K
R105 22K
R106 10K
Q101
R108 22K
Q102
Q103
Q104
R109 22K
R113 1K
C101 10μF 16V
C102 10μF 16V
R115 7.5K
IC101 COMPARATOR
Q101~Q104 PEDESTAL CONTROL
20
5
12
Q1 LOW/LIGHT DETECT
Q2 POWER CONTROL
C3 10μF 10V
C5 47μF 6.3V
R8 47K
R10 150K
Q1
Q2
R9 100
C4 10μF10V
R11 1K
R7 100K
R12 2.2K
C1 47μF 6.3V
IC1
IC1, IC2 CAMERA NUMBER CONTROL
IC2
R38 1K
R39 1K
Z1
Z2
SW3
SW2
SW1
SW4
ON
OFF
SW1,SW2,SW3 CONNECTION
SW3 CAMERA NUMBER SETTING SWITCH (3RD PLACE)
SW2 CAMERA NUMBER SETTING SWITCH (2ND PLACE)
SW1 CAMERA NUMBER SETTING SWITCH (1ST PLACE)
SW4 CAMERA NUMBER ON/OFF SWITCH
+4.9V(a)
R200 10K
UTO WHITE BALANCE CONTROL
C12 0.1μF
VR2 R ATW GAIN
IC4(a) R ATW OUT PUT
R26 390
IC4(a)
VR2 3.3K
IC4(c)
R30 10K
R33 20K
R34 27K
VR4 R ATW PRESET
VR4 6.8K
VR5 3.3K
J28
IC4(b)
VR3 3.3K
IC4(d)
R31 10K
R32 13K
R35 16K
R29 18K
IC4(b) B GAIN CONTROL
VR3 B ATW GAIN
IC4(d) B ATW OUTPUT
VR5 B ATW PRESET
C16 47μF 6.3V
R54 47K
R53 47K
IC7(a)
IC7(b)
IC7(a) B-Y COMPARATOR
IC7(b) R-Y COMPARATOR
IC8 R/B MANUAL REMOTE SELECT
IC9 MICROPROSSOR
X1
+4.9V
L5 8.2μH
C20 0.1μF
C22 100μF 6.3V
C21 47μF 10V
C26 100uF 6.3V
IC10
IC10 RESET CONTROL
P50 P33 P32 P31 P30 P13 P12 P11 P10 SB1 SB0 SBT
P51 P52 P53 P70 P71 P72 P73 P90 P91 PB0
OSC2 OSC1 Vss VDD X1 X0 IRO RST SYNC
PB1 PB2 PB3 PD0 PD1 PD2 PD3 PF0 PF1 PF2 PF3
Q5 ATW/MAN SELECT
Q6 PAN/NTSC SELECT
Q8 REMOTE CONTROL
Q4 LENS GATE1
Q7 LENS GATE 2
R46 22K
R50 47K
R51 47K
R37 22K
R42 22K
R52 22K
R49 22K
D1
D2
D3
+4.9V(b)
+4.9V(c)
8 21
C19 0.1μF
R58 8.2K
IC8
IC6(b)
Q9
R60 22K
R59 2.2K
C25 10μF 10V
C18 47μF 6.3V
R61 10K
IC6(b) BUFFER
Q9 REMOTE CONTROL
IC6(a) BUFFER
R55 68K
R56 200K
Z3
R63 1K
R62 1K
+4.9V(b)
+1.8V
Q10
Q11
Q11 PULSE CONT
R64 22K
R65 10K
R66 1.5K
R67 10K
R68 6.2K
C23 220PF
R69 22K
C24 47PF
R70 15K
Q10 GATE PULSE CONT
Q3
Q3 INVERTER
R15 10K
C9 47PF
R16 15K
R17 22K
R14 10K
R13 10K
IC11
IC11 CHARACTOR GENERATOR
HCR VERT B OUT OSC 2 OSC 1 Vss BCR VDD A3 A2 A1 A0 CK CS
C6 30PF
VR1 6.8K
C7 0.1μF
C8 47μF 10V
VR1 CHARACTER SIZE
9
7
11
10
19
3
4
5
6
7

SW1,SW2,SW3 CONNECTION

CAM NO.		0	1	2	3	4	5	6	7	8	9
OUT PUT	1	L	L	L	L	L	L	L	L	H	H
	2	L	L	L	L	H	H	H	H	L	L
	4	L	L	H	H	L	L	H	H	L	L
	8	L	H	L	H	L	H	L	H	L	H

CONDUCTOR VIEW OF MICROPROCESSOR BOARD


MICROPROCESSOR BOARD
VR1 CHARACTER SIZE
VR5 B ATW PRESET
VR4 R ATW PRESET
VR3 B ATW GAIN
VR2 R ATW GAIN
SW3
SW2
SW1
SW4
OFF
ON
Z1
Z2
Z3
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
D1
D2
D3
X1
J1
L1
L2
L3
L5
CN1
C
B
A
1
2
3
4
5

SW1
CAMERA NUMBER SETTING SWITCH
(1ST PLACE)

SW2
CAMERA NUMBER SETTING SWITCH
(2ND PLACE)

SW3
CAMERA NUMBER SETTING SWITCH
(3RD PLACE)

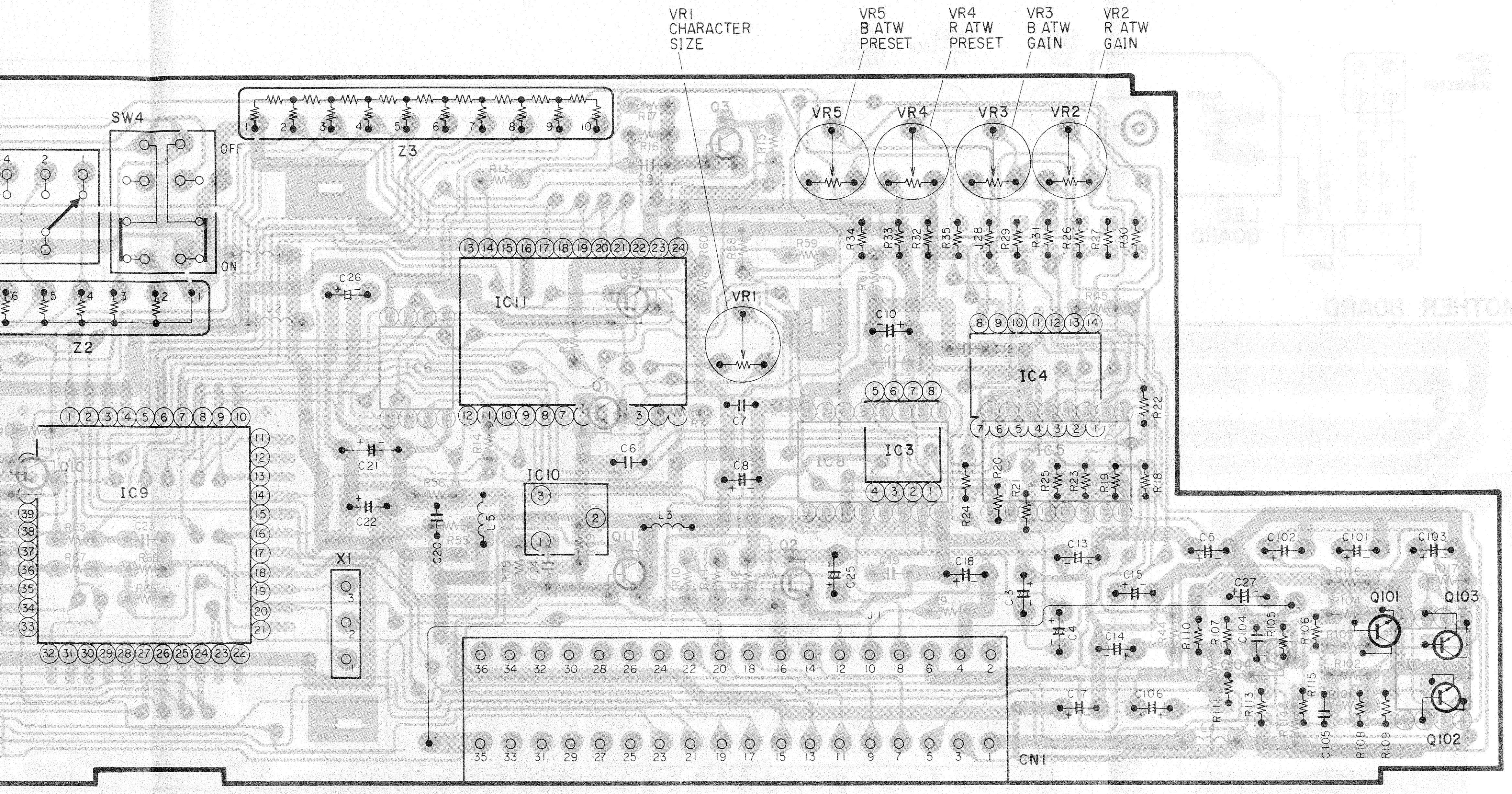
SW4
CAMERA NUMBER ON/OFF SWITCH

TO
MOTHER
BOARD

CN1

1	+1.8V IN	13	B DETECT IN	25	NOT USED
2	B CONTROL OUT	14	R CONTROL OUT	26	NOT USED
3	AGC DC IN	15	R DETECT IN	27	NOT USED
4	GROUND	16	+4.9V IN	28	NOT USED
5	PEDESTAL CONTROL OUT	17	REF IN	29	NOT USED
6	+4.9V IN	18	ATW B CONTROL OUT	30	NOT USED
7	BL IN	19	CHARACTER OUT	31	NOT USED
8	MAN R/B CONTROL IN	20	WHD IN	32	NOT USED
9	ATW GATE PULSE OUT	21	REMOTE CONTROL IN	33	NOT USED
10	Vp IN	22	R GAIN CONTROL OUT	34	NOT USED
11	AUTO/MANU CONTROL IN	23	ATW R CONTROL OUT	35	+8.6V IN
12	LOW LIGHT INF IN	24	NOT USED	36	+8.6V IN

CONDUCTOR VIEW OF MICROPROCESSOR BOARD


VR1 CHARACTER SIZE
VR5 B ATW PRESET
VR4 R ATW PRESET
VR3 B ATW GAIN
VR2 R ATW GAIN
SW4
OFF
ON
Z3
Z2
IC11
IC9
IC10
IC6
IC8
IC3
IC4
IC5
X1
Q1
Q2
Q3
Q9
Q10
Q11
Q101
Q102
Q103
Q104
J1
CN1

SWITCH

SWITCH

SWITCH

WITCH

CN1

TO
MOTHER
BOARD

1	+1.8V IN	13	B DETECT IN	25	NOT USED
2	B CONTROL OUT	14	R CONTROL OUT	26	NOT USED
3	AGC DC IN	15	R DETECT IN	27	NOT USED
4	GROUND	16	+4.9V IN	28	NOT USED
5	PEDESTAL CONTROL OUT	17	REF IN	29	NOT USED
6	+4.9V IN	18	ATW B CONTROL OUT	30	NOT USED
7	BL IN	19	CHARACTER OUT	31	NOT USED
8	MAN R/B CONTROL IN	20	WHD IN	32	NOT USED
9	ATW GATE PULSE OUT	21	REMOTE CONTROL IN	33	NOT USED
10	Vp IN	22	R GAIN CONTROL OUT	34	NOT USED
11	AUTO/MANU CONTROL IN	23	ATW R CONTROL OUT	35	+8.6V IN
12	LOW LIGHT INF IN	24	NOT USED	36	+8.6V IN

▨ COMPONENT SIDE
▨ PATTERN SIDE

3 4 5 6

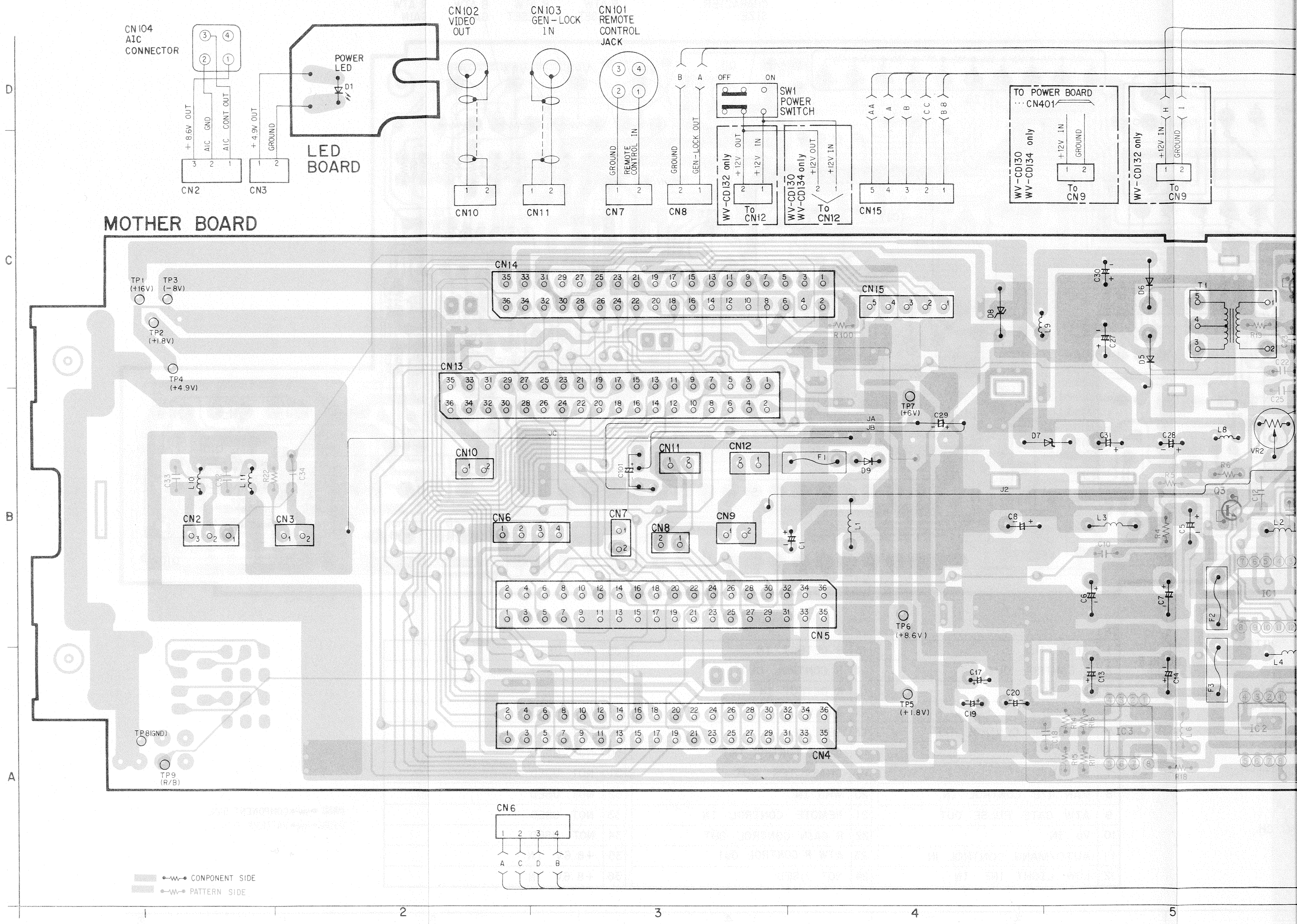
Microprocessor Board

IC1	NJU4052BM		C1
IC2	NJU4052BM		B1
IC3	NJM2904M		B4
IC4	NJM2902M		C5
IC5	NJU4052BM		B5
IC6	NJM2904M		C3
IC7	AN6914S		B2
IC8	NJU4052BM		B4
IC9	MN1552CVY		B2
IC10	M51951AMLW		B4
IC11	M50450FP		C4
IC101	NJM2903M		B6
Q1	2SC2405RSTTW	(S)	C4
Q2	2SB709-Q	(A)	B4
Q3	2SD601-QR	(Y)	C4
Q4	2SD601-QR	(Y)	C1
Q5	2SD601-QR	(Y)	B1
Q6	2SD601-QR	(Y)	B1
Q7	2SD601-QR	(Y)	C2
Q8	2SD601-QR	(Y)	B2
Q9	2SB709-Q	(A)	C4
Q10	2SB709-Q	(A)	B2
Q11	2SD601-QR	(Y)	B4
Q101	2SD601-QR	(Y)	B6
Q102	2SD601-QR	(Y)	B6
Q103	2SB709-Q	(A)	B6
Q104	2SD601-QR	(Y)	B5
D1	MA151WK	(MU)	C2
D2	MA151WK	(MU)	B2
D3	MA151K	(MH)	B2

CONDUCTOR VIEW OF MOTHER BOARD

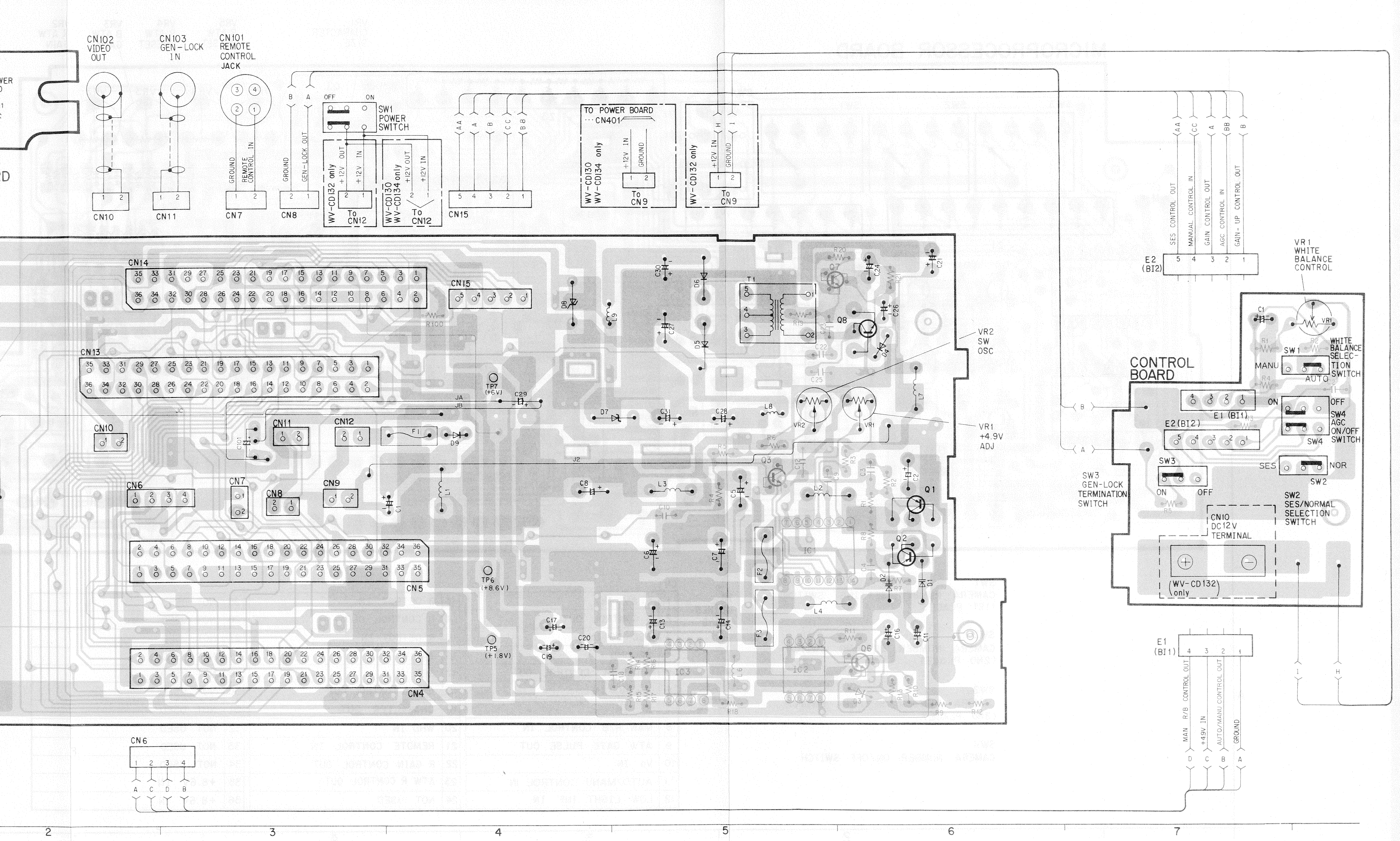
Mother Board

IC1	NJM2048MC		B5
IC2	M5218FP		A5
IC3	NJM3414M		A5
Q1	2SB837-CD		B6
Q2	2SB837-CD		B6
Q3	2SD601-QR	(Y)	B5
Q6	2SB970-QRS	(1R)	A6
Q7	2SD602-QRS	(W)	C6
Q8	2SC3303-0Y		C6
D1	EK14		B6
D2	EK14		B6
D3	MA151K	(MH)	A6
D4	MA170		C6
D5	EU01A		C5
D6	EU01A		C5
D7	RD18EB3		B5
D8	RD9.1EB3		C4
D9	SS1.5J4		B4

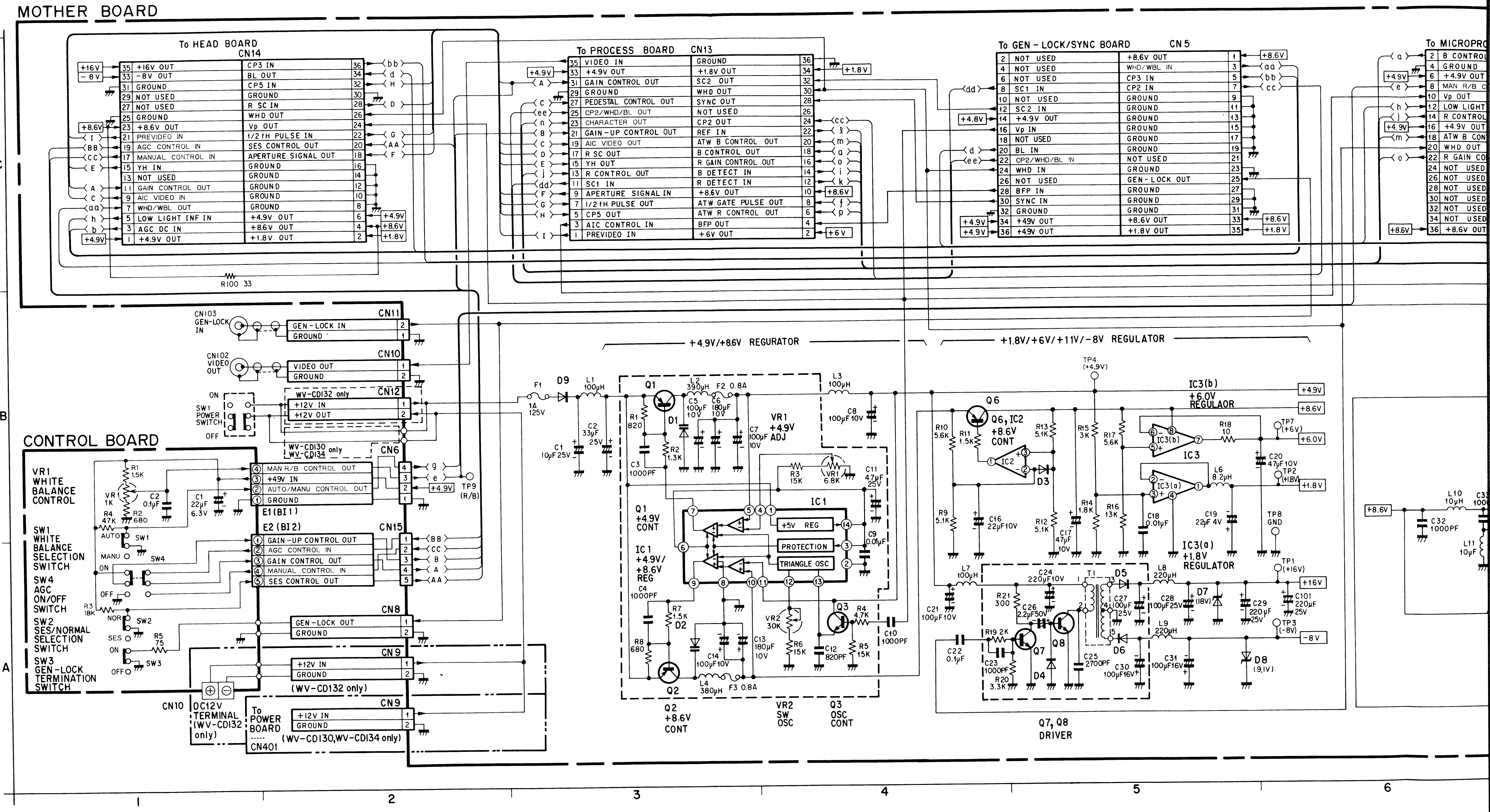


CN104 AIC CONNECTOR
+8.6V OUT
AIC GND
AIC CONT OUT
CN2
+4.9V OUT
GROUND
CN3
POWER LED
D1
LED BOARD
CN102 VIDEO OUT
CN10
CN103 GEN-LOCK IN
CN11
CN101 REMOTE CONTROL JACK
GROUND
REMOTE CONTROL IN
CN7
GEN-LOCK OUT
CN8
OFF
ON
SW1 POWER SWITCH
WV-CD132 only
+12V OUT
+12V IN
To CN12
WV-CD130
WV-CD134 only
CN15
TO POWER BOARD
···CN401
To CN9
MOTHER BOARD
TP1 (+16V)
TP3 (-8V)
TP2 (+1.8V)
TP4 (+4.9V)
TP7 (+6V)
TP6 (+8.6V)
TP5 (+1.8V)
TP8(GND)
TP9 (R/B)
CN14
CN13
CN12
CN6
CN9
CN5
CN4
T1
IC1
IC2
IC3
VR2
Q3
F1
F2
F3
JA
JB
JC
J2
D5
D6
D7
D8
D9
R100
CONPONENT SIDE
PATTERN SIDE
D
C
B
A
1
2
3
4
5

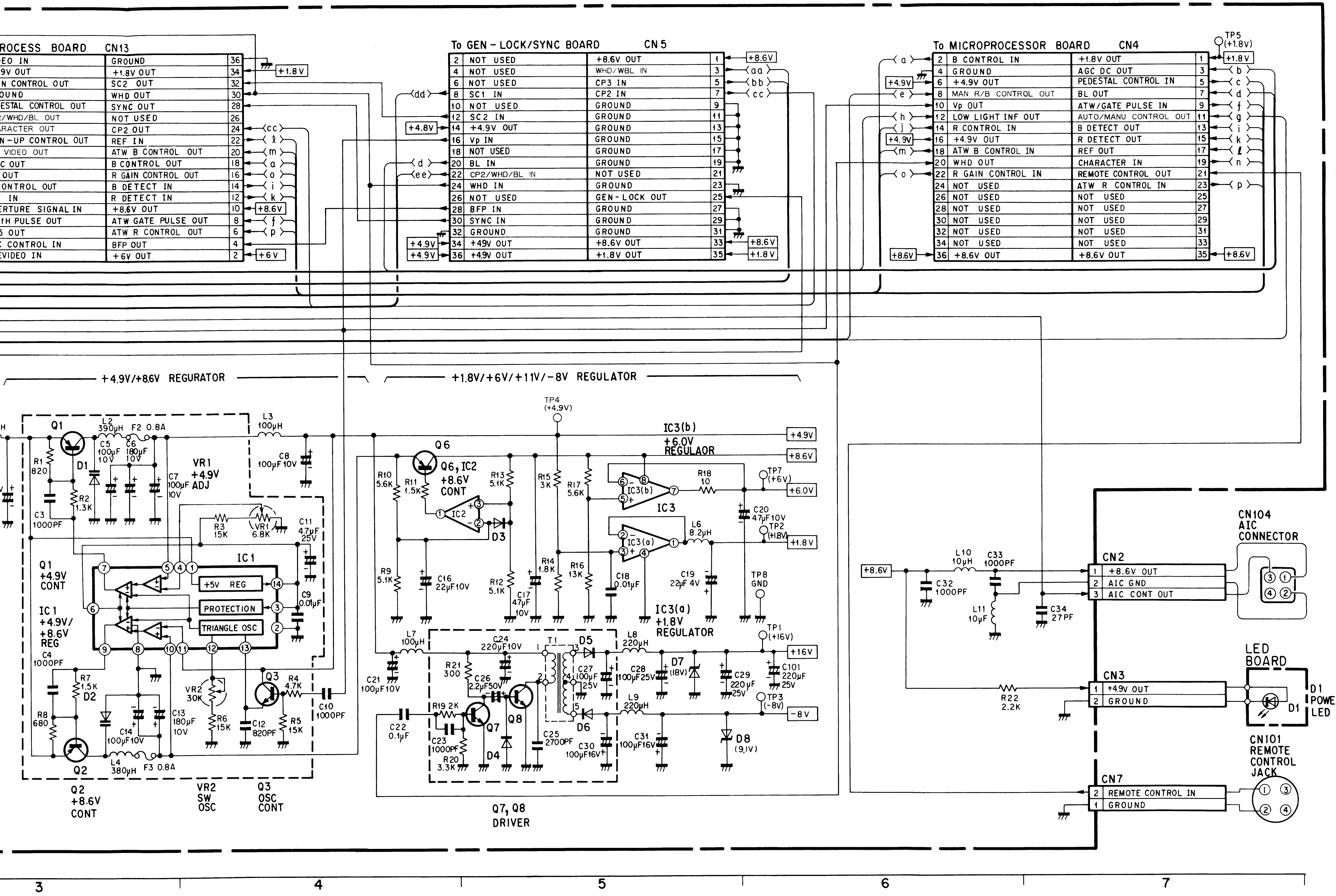
CONDUCTOR VIEW OF MOTHER BOARD


CN102 VIDEO OUT
CN103 GEN-LOCK IN
CN101 REMOTE CONTROL JACK
CN10
CN11
CN7
GROUND
REMOTE CONTROL IN
CN8
GROUND
GEN-LOCK OUT
SW1 POWER SWITCH
OFF
ON
WV-CD132 only
+12V OUT
+12V IN
To CN12
WV-CD130
WV-CD134 only
+12V OUT
+12V IN
To CN12
AA
A
B
CC
BB
CN15
TO POWER BOARD
···CN401
WV-CD130
WV-CD134 only
+12V IN
GROUND
To CN9
WV-CD132 only
+12V IN
GROUND
H
I
To CN9
CN14
CN13
CN10
CN6
CN7
CN8
CN9
CN11
CN12
CN5
CN4
TP7 (+6V)
TP6 (+8.6V)
TP5 (+1.8V)
JA
JB
JC
J2
F1
F2
F3
T1
IC1
IC2
IC3
Q1
Q2
Q3
Q6
Q7
Q8
VR1
VR2
VR2 SW OSC
VR1 +4.9V ADJ
SES CONTROL OUT
MANUAL CONTROL IN
GAIN CONTROL OUT
AGC CONTROL IN
GAIN-UP CONTROL OUT
E2 (BI2)
VR1 WHITE BALANCE CONTROL
CONTROL BOARD
SW1
MANU
AUTO
WHITE BALANCE SELECTION SWITCH
E1 (BI1)
E2 (BI2)
ON
OFF
SW4 AGC ON/OFF SWITCH
SW3
SES
NOR
SW2
SW3 GEN-LOCK TERMINATION SWITCH
SW2 SES/NORMAL SELECTION SWITCH
CN10 DC12V TERMINAL
(WV-CD132) only
E1 (BI1)
MAN R/B CONTROL OUT
+49V IN
AUTO/MANU CONTROL OUT
GROUND
D
C
B
A
CN6
A
C
D
B
2
3
4
5
6
7

SCHEMATIC DIAGRAM OF MOTHER BOARD


MOTHER BOARD
To HEAD BOARD CN14
35 +16V OUT
33 -8V OUT
31 GROUND
29 NOT USED
27 NOT USED
25 GROUND
23 +8.6V OUT
21 PREVIDEO IN
19 AGC CONTROL IN
17 MANUAL CONTROL IN
15 YH IN
13 NOT USED
11 GAIN CONTROL OUT
9 AIC VIDEO IN
7 WHD/WBL OUT
5 LOW LIGHT INF IN
3 AGC DC IN
1 +4.9V OUT
CP3 IN 36
BL OUT 34
CP5 IN 32
GROUND 30
R SC IN 28
WHD OUT 26
Vp OUT 24
1/2 fH PULSE IN 22
SES CONTROL OUT 20
APERTURE SIGNAL OUT 18
GROUND 16
GROUND 14
GROUND 12
GROUND 10
GROUND 8
+4.9V OUT 6
+8.6V OUT 4
+1.8V OUT 2
R100 33
To PROCESS BOARD CN13
35 VIDEO IN
33 +4.9V OUT
31 GAIN CONTROL OUT
29 GROUND
27 PEDESTAL CONTROL OUT
25 CP2/WHD/BL OUT
23 CHARACTER OUT
21 GAIN-UP CONTROL OUT
19 AIC VIDEO OUT
17 R SC OUT
15 YH OUT
13 R CONTROL OUT
11 SC1 IN
9 APERTURE SIGNAL IN
7 1/2 fH PULSE OUT
5 CP5 OUT
3 AIC CONTROL IN
1 PREVIDEO IN
GROUND 36
+1.8V OUT 34
SC2 OUT 32
WHD OUT 30
SYNC OUT 28
NOT USED 26
CP2 OUT 24
REF IN 22
ATW B CONTROL OUT 20
B CONTROL OUT 18
R GAIN CONTROL OUT 16
B DETECT IN 14
R DETECT IN 12
+8.6V OUT 10
ATW GATE PULSE OUT 8
ATW R CONTROL OUT 6
BFP OUT 4
+6V OUT 2
To GEN-LOCK/SYNC BOARD CN5
2 NOT USED
4 NOT USED
6 NOT USED
8 SC1 IN
10 NOT USED
12 SC2 IN
14 +4.9V OUT
16 Vp IN
18 NOT USED
20 BL IN
22 CP2/WHD/BL IN
24 WHD IN
26 NOT USED
28 BFP IN
30 SYNC IN
32 GROUND
34 +49V OUT
36 +4.9V OUT
+8.6V OUT 1
WHD/WBL IN 3
CP3 IN 5
CP2 IN 7
GROUND 9
GROUND 11
GROUND 13
GROUND 15
GROUND 17
GROUND 19
NOT USED 21
GROUND 23
GEN-LOCK OUT 25
GROUND 27
GROUND 29
GROUND 31
+8.6V OUT 33
+1.8V OUT 35
To MICROPRO
2 B CONTROL
4 GROUND
6 +4.9V OUT
8 MAN R/B C
10 Vp OUT
12 LOW LIGHT
14 R CONTROL
16 +4.9V OUT
18 ATW B CON
20 WHD OUT
22 R GAIN CO
24 NOT USED
26 NOT USED
28 NOT USED
30 NOT USED
32 NOT USED
34 NOT USED
36 +8.6V OUT
CN103 GEN-LOCK IN
CN11 GEN-LOCK IN GROUND
CN102 VIDEO OUT
CN10 VIDEO OUT GROUND
WV-CD132 only CN12 +12V IN +12V OUT
SW1 POWER SWITCH ON OFF
WV-CD130 WV-CD134 only CN6
TP9 (R/B)
CONTROL BOARD
VR1 WHITE BALANCE CONTROL
SW1 WHITE BALANCE SELECTION SWITCH
SW4 AGC ON/OFF SWITCH
SW2 SES/NORMAL SELECTION SWITCH
SW3 GEN-LOCK TERMINATION SWITCH
E1(BI1)
④ MAN R/B CONTROL OUT
③ +49V IN
② AUTO/MANU CONTROL OUT
① GROUND
E2(BI2) CN15
① GAIN-UP CONTROL OUT
② AGC CONTROL IN
③ GAIN CONTROL OUT
④ MANUAL CONTROL IN
⑤ SES CONTROL OUT
R1 1.5K VR1 1K R4 47K R2 680 C2 0.1µF C1 22µF 6.3V R3 18K R5 75
AUTO MANU ON OFF NOR SES
CN8 GEN-LOCK OUT GROUND
CN9 +12V IN GROUND (WV-CD132 only)
CN10 DC12V TERMINAL (WV-CD132 only)
To POWER BOARD CN401
CN9 +12V IN GROUND (WV-CD130, WV-CD134 only)
+4.9V/+8.6V REGURATOR
F1 1A 125V D9 L1 100µH C1 10µF 25V C2 33µF 25V
Q1 L2 390µH F2 0.8A C5 100µF 10V C6 180µF 10V C7 100µF 10V
VR1 +4.9V ADJ
R1 820 D1 R2 1.3K C3 1000PF
L3 100µH C8 100µF 10V
R3 15K VR1 6.8K C11 4.7µF 25V
IC1 +5V REG PROTECTION TRIANGLE OSC
C9 0.01µF
Q1 +4.9V CONT
IC1 +4.9V/+8.6V REG
C4 1000PF R7 1.5K D2 R8 680
C14 100µF 10V C13 180µF 10V
VR2 30K R6 15K C12 820PF R4 4.7K R5 15K C10 1000PF
L4 380µH F3 0.8A
Q2 +8.6V CONT
VR2 SW OSC
Q3 OSC CONT
+1.8V/+6V/+11V/-8V REGULATOR
TP4 (+4.9V)
Q6 Q6, IC2 +8.6V CONT
R10 5.6K R11 1.5K R13 5.1K R15 3K R17 5.6K
IC2 D3
IC3(b) +6.0V REGULAOR
R18 10 TP7 (+6V) C20 47µF 10V TP2 (+1.8V)
IC3 IC3(a) L6 8.2µH
R9 5.1K C16 22µF 10V R12 5.1K C17 47µF 10V R14 1.8K R16 13K C18 0.01µF C19 22µF 4V
TP8 GND
IC3(a) +1.8V REGULATOR
L7 100µH C21 100µF 10V C24 220µF 10V T1 D5 L8 220µH
R21 300 C26 2.2µF 50V C27 100µF 25V C28 100µF 25V D7 (18V) C29 220µF 25V
TP1 (+16V) C101 220µF 25V
C22 0.1µF R19 2K Q7 Q8 C23 1000PF R20 3.3K D4 C25 2700PF D6 C30 100µF 16V
L9 220µH C31 100µF 16V D8 (9.1V) TP3 (-8V)
Q7, Q8 DRIVER
+4.9V +8.6V +6.0V +1.8V +16V -8V
L10 10µH C32 1000PF L11 10µF
1 2 3 4 5 6
A B C

SCHEMATIC DIAGRAM OF MOTHER BOARD



ROCESS BOARD CN13
EO IN
GROUND
9V OUT
+1.8V OUT
N CONTROL OUT
SC2 OUT
OUND
WHD OUT
ESTAL CONTROL OUT
SYNC OUT
/WHD/BL OUT
NOT USED
RACTER OUT
CP2 OUT
N-UP CONTROL OUT
REF IN
VIDEO OUT
ATW B CONTROL OUT
C OUT
B CONTROL OUT
OUT
R GAIN CONTROL OUT
ONTROL OUT
B DETECT IN
IN
R DETECT IN
ERTURE SIGNAL IN
+8.6V OUT
fH PULSE OUT
ATW GATE PULSE OUT
5 OUT
ATW R CONTROL OUT
CONTROL IN
BFP OUT
EVIDEO IN
+6V OUT
To GEN-LOCK/SYNC BOARD CN5
NOT USED
+8.6V OUT
WHD/WBL IN
CP3 IN
SC1 IN
CP2 IN
GROUND
SC2 IN
+4.9V OUT
Vp IN
BL IN
CP2/WHD/BL IN
NOT USED
WHD IN
GEN-LOCK OUT
BFP IN
SYNC IN
+4.9V OUT
+1.8V OUT
To MICROPROCESSOR BOARD CN4
B CONTROL IN
+1.8V OUT
AGC DC OUT
+4.9V OUT
PEDESTAL CONTROL IN
MAN R/B CONTROL OUT
BL OUT
Vp OUT
ATW/GATE PULSE IN
LOW LIGHT INF OUT
AUTO/MANU CONTROL OUT
R CONTROL IN
B DETECT OUT
R DETECT OUT
ATW B CONTROL IN
REF OUT
WHD OUT
CHARACTER IN
R GAIN CONTROL IN
REMOTE CONTROL OUT
ATW R CONTROL IN
+8.6V OUT
TP5 (+1.8V)
+4.9V/+8.6V REGURATOR
+1.8V/+6V/+11V/-8V REGULATOR
Q1
L2 390μH
F2 0.8A
C5 100μF 10V
C6 180μF 10V
D1
R1 820
R2 1.3K
C3 1000PF
C7 100μF 10V
VR1 +4.9V ADJ
L3 100μH
C8 100μF 10V
R3 15K
VR1 6.8K
C11 4.7μF 25V
IC1
+5V REG
PROTECTION
TRIANGLE OSC
C9 0.01μF
Q1 +4.9V CONT
IC1 +4.9V/ +8.6V REG
C4 1000PF
R7 1.5K
D2
R8 680
VR2 30K
R6 15K
C12 820PF
Q3
R4 4.7K
R5 15K
C10 1000PF
C13 180μF 10V
C14 100μF 10V
L4 380μH
F3 0.8A
Q2
Q2 +8.6V CONT
VR2 SW OSC
Q3 OSC CONT
TP4 (+4.9V)
Q6
Q6, IC2 +8.6V CONT
R10 5.6K
R11 1.5K
IC2
D3
R13 5.1K
R15 3K
R17 5.6K
IC3(b) +6.0V REGULAOR
IC3(b)
R18 10
TP7 (+6V)
IC3
C20 47μF 10V
TP2 (+1.8V)
L6 8.2μH
IC3(a)
R9 5.1K
C16 22μF 10V
R12 5.1K
R14 1.8K
C17 47μF 10V
R16 13K
C18 0.01μF
C19 22μF 4V
TP8 GND
IC3(a) +1.8V REGULATOR
TP1 (+16V)
L7 100μH
C24 220μF 10V
T1
D5
L8 220μH
D7 (18V)
C101 220μF 25V
C21 100μF 10V
R21 300
C26 2.2μF 50V
C27 100μF 25V
C28 100μF 25V
C29 220μF 25V
TP3 (-8V)
C22 0.1μF
R19 2K
Q7
Q8
L9 220μH
C23 1000PF
R20 3.3K
D4
C25 2700PF
D6
C30 100μF 16V
C31 100μF 16V
D8 (9.1V)
Q7, Q8 DRIVER
+4.9V
+8.6V
+6.0V
+1.8V
+16V
-8V
+8.6V
L10 10μH
C33 1000PF
C32 1000PF
L11 10μF
C34 27PF
CN2
+8.6V OUT
AIC GND
AIC CONT OUT
CN104 AIC CONNECTOR
R22 2.2K
CN3
+4.9V OUT
GROUND
LED BOARD
D1 POWER LED
D1
CN101 REMOTE CONTROL JACK
CN7
REMOTE CONTROL IN
GROUND
3
4
5
6
7

Mother Board

IC1	NJM2048MC		A4
IC2	M5218FP		B5
IC3	NJM3414M		B5
Q1	2SB837-CD		B3
Q2	2SB837-CD		B3
Q3	2SD601-QR	(Y)	A4
Q6	2SB970-QRS	(1R)	B4
Q7	2SD602-QRS	(W)	A5
Q8	2SC3303-0Y		A5
D1	EK14		B3
D2	EK14		A3
D3	MA151K	(MH)	B5
D4	MA170		A5
D5	EU01A		A5
D6	EU01A		A5
D7	RD18EB3		A5
D8	RD9.1EB3		A5
D9	SS1.5J4		B3

	IC1	IC2	IC3
Pin 1	12.0	6.6	1.7
2	0	4.1	1.7
3	5.0	4.1	1.7
4	0.5	0	0
5	5.0	2.8	5.7
6	5.0	2.8	5.8
7	6.3	11.1	6.2
8	0	11.6	8.2
9	3.2		
10	8.6		
11	5.0		
12	3.8		
13	2.6		
14	5.0		

	Q1	Q2	Q3	Q6	Q7	Q8
B	11.3	11.1	0	7.9	-0.4	15.6
C	5.0	8.6	4.7	8.2	1.5	6.1
E	12.0	12.0	2.6	8.6	0	0

REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Components identified by "o" mark are new parts used from this model.
3. Complete printed circuit board assembly is not available as replacement part.

SYMBOL NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION
COLOR CCTV CAMERA WV-CD130			
MISCELLANEOUS			
CN101	YFHR10A7R4S	YWHR10A7R4S	4 pin Remoto Control Connector
CN110	YFCE030908FA	YWCO309-08F	AC Power Cord for WV-CD130/C,WV-CD130N/C
⚠	HBS308A	YWHBS-3-08	AC Power Cord for WV-CD130/B
⚠	YFVM030908A	YWVM0309-08	AC Power Cord for WV-CD130/G
⚠	YFKPGTSA25	YWKPGTSA-03	AC Power Cord for WV-CD130N/A
M36	YFV2PA0208A4	YFV2PA0208B4	Insulator
MICROPROCESSOR BOARD			
R32	YF2116133JT	YF2116133GT	Carbon 13K ohms 1/16W
R34	YF2116273JT	YF2116273GT	Carbon 27K ohms 1/16W
R55	YF2116683JT	YF2116683GT	Carbon 68K ohms 1/16W
R59	YF2116222JT	YF2116222GT	Carbon 2.2K ohms 1/16W
R111	YF2116272JT	YF2116272GT	Carbon 2.7K ohms 1/16W
R113	YF2116102JT	YF2116102GT	Carbon 1K ohms 1/16W
R115	YF2116912JT	YF2116912GT	Carbon 9.1K ohms 1/16W
R116	YF2116821JT	YF2116821GT	Carbon 820 ohms 1/16W
R200	---------------	ERJ8GCSJ103	Carbon 10K ohms 1/8W
C1	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C2	ECEA0JKS470	---------------	Deletion
C3,4	ECEA1AKK100	ECEA1EK100	Electrolytic 10µF 10V
C5	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C10	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C13	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C14,15	ECEA1EKS4R7	ECEA1ES4R7	Electrolytic 4.7µF 25V
C16-18	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C25	ECEA1AKK100	ECEA1EK100	Electrolytic 10µF 10V
C27	ECEA1AKK100	ECEA1EK100	Electrolytic 10µF 10V
C106	ECEA0JU101	ECEA0JKS101	Electrolytic 100µF 6.3V
GEN-LOCK/SYNC BOARD			
IC1	YFNJM1496M	NJM1496M	IC
Q12	2SA1022-CD	2SA1022-C	Transistor
R49	YFLP161KGT57	LP161KGT57	Carbon 1K ohms
R70	YF2116393JT	YF2116393GT	Carbon 39K ohms 1/16W
R79	YF2116683JT	YF2116683GT	Carbon 68K ohms 1/16W
R85	YF2116433JT	YF2116433GT	Carbon 43K ohms 1/16W
R150	---------------	YF2116223JT	Carbon 22K ohms 1/16W
VR1	YFH0522A47K	EVML3GA00B54	Variable Resistor 50K ohms
VR2	YFH0522A100K	oEVML3GA00B15	Variable Resistor 100K ohms
C1	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C3	YF400104XKT	YF400104FZT	Ceramic 0.1µF
C11	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C18	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V

SYMBOL NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION
C22	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C24	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C26	ECEA1AKS4R7	ECEA1AS470	Electrolytic 47µF 10V
C27	ECEA1AKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C28,29	ECEA1AKS4R7	ECEA1AS470	Electrolytic 47µF 10V
C39	ECEA1AKS470	ECEA1AS470	Electrolytic 47µF 10V
J125	---------------	YF21160R00T	Jamper Resistor
J201	---------------	YF21160R00T	Jamper Resistor
CCD BOARD			
Q2	2SA1022-CTW	2SA1022-C	Transistor
Q5	2SA1022-CTW	2SA1022-C	Transistor
R4	YF2116514JT	YF2116514GT	Carbon 510K ohms 1/16W
R13	YF2116332JT	YF2116392JT	Carbon 3.9K ohms 1/16W
C1	ECSF1EE106	oECST1ED106ZR	Tantalum 10µF 25V
C21	ECSF1CE106	oECST1CD106ZR	Tantalum 10µF 16V
PROCESS VIC-1 BOARD			
Q2	2SD602-QRS	2SD601-QR	Transistor
Q5	2SD602-QRS	2SD601-QR	Transistor
M48	YFV2HA0466A4	oYFV2HA0466B4	Shield Cover-7
PROCESS VIC-2 BOARD			
R3	YF2116152JT	YF2116122JT	Carbon 1.2K ohms 1/16W
C2	ECEA1CKS220	ECEA1CK220	Electrolytic 22µF 16V
PROCESS VIC-3 BOARD			
Q9	2SB709-Q	---------------	Deletion
D1	---------------	MA151KTX	Diode
R6	YF2116133JT	YF2116133GT	Carbon 13K ohms 1/16W
R12	YF2116133JT	YF2116133GT	Carbon 13K ohms 1/16W
R25	-2116912JT	YF2116912GT	Carbon 9.1K ohms 1/16W
R38	YF2116133JT	YF2116133GT	Carbon 13K ohms 1/16W
R42	YF2116332JT	---------------	Deletion
R45	YF2116302JT	YF2116302GT	Carbon 3K ohms 1/16W
R48	YF2116302JT	YF2116302GT	Carbon 3K ohms 1/16W
C18-20	ECEA1EKS4R7	ECEA1ES4R7	Electrolytic 4.7µF 25V
C26	ECEA0JKS470	ECEA0JS470	Electrolytic 47µF 6.3V
C28	ECEA1AKS470	ECEA1AS470	Electrolytic 47µF 10V
C43	YF400103FZT	---------------	Deletion
C31,32	---------------	YF400820CHJT	Ceramic 82pF
CT1	ECRHA120N11	YFTZ03P600YR	Trimmer Capacitor 60pF
L1	EL05S1390K	oNL32T390K	Coil 39µH
HEAD BOARD			
IC8	YFNJM2930L05	NJM2930L05	IC
Q3,4	2SA1022-CTW	2SA1022-C	Transistor
R14	---------------	YF2116912GT	Carbon 9.1K ohms 1/16W

SYMBOL NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION
R42,43	YF2116912JT	YF2116912GT	Carbon 9.1k ohms 1/16W
R51	YF2116303JT	YF2116303GT	Carbon 30k ohms 1/16W
R59	YF2116472JT	YF2116472GT	Carbon 4.7k ohms 1/16W
R103	YF2116303JT	YF2116303GT	Carbon 30k ohms 1/16W
R107	YF2116472JT	YF2116472GT	Carbon 4.7k ohms 1/16W
R113	YFLP16332J56	LP16332J56	Carbon 3.3k ohms
VR1	YFH0522A10K	oEVML1GA00B14	Variable Resistor 10K ohms
VR2	YFH0522A220K	EVML1GA00B25	Variable Resistor 200K ohms
VR3	YFH0522A100K	EVML1GA00B15	Variable Resistor 100K ohms
VR4,5	YFH0522A10K	oEVML1GA00B14	Variable Resistor 10K ohms
C16	ECEA1AKK100	ECEA1EK100	Electrolytic 10μF 10V
C25,26	ECEA1AKK100	ECEA1EK100	Electrolytic 10μF 10V
C28	ECEA1AKK100	ECEA1EK100	Electrolytic 10μF 10V
C32	ECEA1AKK100	ECEA1EK100	Electrolytic 10μF 10V
C37	ECEA1AKK100	ECEA1EK100	Electrolytic 10μF 10V
C40	ECEA1AKK100	ECEA1EK100	Electrolytic 10μF 10V
C74	ECEA0JKS220	ECEA0JK220	Electrolytic 22μF 6.3V
C81	ECEA1AKS470	ECEA1AS470	Electrolytic 47μF 10V
M54	YFV2HA0454A4	oYFV2HA0454B4	Shield Cover-7
M81	————	oYWV2PA0218A4	Insulator Paper
M82	————	oYWV2PA0219A4	Spacer
PROCESS BOARD			
Q10,11	2SA1022-C	2SA1022-BCTX	Transistor
Q12	2SC2404-CDTW	2SC2404-CDTX	Transistor
D1	MA151K	MA151KTX	Diode
R11	YF2116472JT	YF2116472GT	Carbon 4.7K ohms 1/16W
R13	YF2116302JT	YF2116302GT	Carbon 3K ohms 1/16W
R15	YF2116472JT	YF2116472GT	Carbon 4.7K ohms 1/16W
R25	YF2116472JT	YF2116472GT	Carbon 4.7K ohms 1/16W
R27	YF2116272JT	YF2116752JT	Carbon 7.5K ohms 1/16W
R32	YF2116133JT	YF2116133GT	Carbon 13K ohms 1/16W
R53	YF2116202JT	YF2116242GT	Carbon 2.4K ohms 1/16W
R62	YF2116103JT	————	Deletion
C17	ECEA1CKS220	ECEA1CK220	Electrolytic 22μF 16V
C24,25	ECEA0JKS470	ECEA0JS470	Electrolytic 47μF 6.3V
J29	YF21160R00T	————	Deletion
MOTHER BOARD			
R4	YF2116472JT	YF2116472GT	Carbon 4.7K ohms 1/16W
R16	YF2116133JT	YF2116133GT	Carbon 13K ohms 1/16W
C11	ECEA1EKS4R7	ECEA1ES4R7	Electrolytic 4.7μF 25V
C17	ECEA1AKS470	ECEA1AS470	Electrolytic 47μF 10V
C20	ECEA1AKS470	ECEA1AS470	Electrolytic 47μF 10V
C29	ECEA1EU471	ECEA1ES221	Electrolytic 220μF 25 V for WV-CD132
C101	ECEA1EU221	ECEA1ES221	Electrolytic 220μF 25 V
CN1-JM	YFB02DR	————	Deletion
CN2-JM	YFB03DR	YWB03DR	3 pin Jack Male
CN16,17-JM	YFB02DA-8M	YF02DA-8M	2 pin Jack Male
CONTROL BOARD			
R1	YF2116272JT	YF2116152JT	Carbon 1.5K ohms 1/16W
R2	YF2116132JT	YF2116681JT	Carbon 680 ohms 1/16W
R3	YF2116473GT	YF2116183JT	Carbon 18K ohms 1/16W

SYMBOL NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION
C1	ECEA0JKS220	ECEA0JK220	Electrolytic 22μF 6.3V
COLOR CCTV CAMERA WV-CD132			
MISCELLANEOUS			
M36	YFV2PA0208A4	oYFV2PA0208B4	Insulator Paper
COLOR CCTV CAMERA WV-CD134			
MISCELLANEOUS			
M36	YFV2PA0208A4	oYFV2PA0208B4	Insulator Paper